MAR 26 1929

Quoting a Well and Favorably Known Member of the Medical Faculty of One of the Foremost Medical Colleges: "If We (the Physicians) Want Scientific Pharmacists We Must Support Them. For the Good of the Public, Physicians and Pharmacists Must Work in Harmony."

Vol. XVIII, No. 3 MARCH, 1929

JOURNAL
OF THE
AMERICAN PHARMACEUTICAL ASSOCIATION

TRADE MARK

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THE 77th ANNUAL MEETING WILL BE HELD AT RAPID CITY (BLACK HILLS), SOUTH DAKOTA, DURING WEEK OF AUGUST 26, 1929.

F. W. Brown, Lead, So. Dak., Local Secretary

The 1929 Meetings of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, Conferences of Pharmaceutical Association Secretaries will also be held at Rapid City, same time and place.

For Association Roster and Roster of the Boards of Pharmacy, of Officers of Pharmaceutical Associations, Local Branches, see pages x, xii, xiv, etc.

Entered as second-class Matter, January 23, 1917, at the Post Office at Easton, Pa., under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103. Act of October 3, 1917; authorized July 10, 1918.

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CHANGES.

PERMANENT changes come slowly and frequently unobserved. Many a temporary ripple glints and vanishes, disappearing into the irresistible urge of the slow, forward tide of affairs.

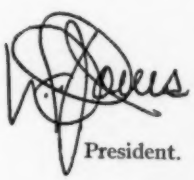
I am reminded of driving through the "Bad Lands" of North Dakota, for many years the home of Theodore Roosevelt and the Marquis de Mores. Associating the names together does not necessarily mean that the two men were associated in any way with each other, except as to time and place.

The Marquis was busy with an idea which very few were familiar with—the building of a packing plant out where the cattle were grown. The Marquis' days were ended by a shot in the back, while in Africa. If he had remained in North Dakota he might have been shot; but he would have died facing his enemy. No person was shot in the back by a self-respecting westerner.

The Chateau of the Marquis still stands as a museum of all his personal belongings, and he was wealthy. Theodore Roosevelt found his way to the White House.

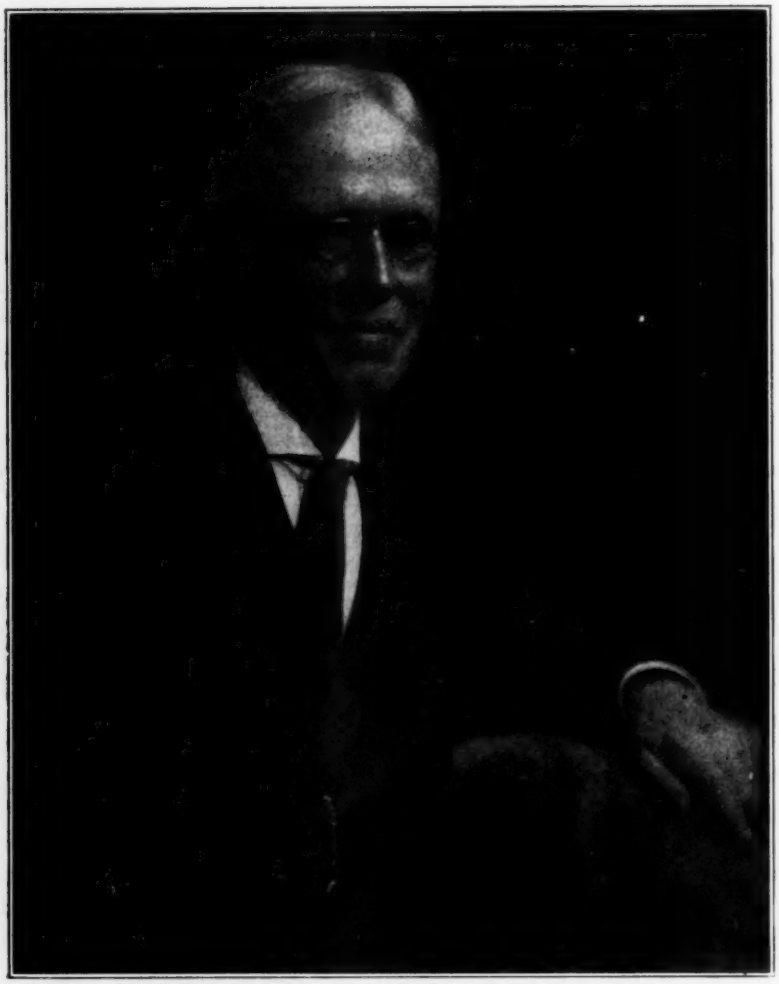
To one driving through the country the fact of it once having been their residence has been almost brushed aside, and you again see the "cow country" of early days; but the permanent effect of their influence is stamped there to stay. Now slaughtering plants are being builded out where the stock is available without shipping; and the impress of the character of Theodore Roosevelt has been left, never to be erased.

On every side the unseen hand is bringing about inevitable changes. We worry to-day over those affecting Pharmacy, as they touch here and there in our experiences. We should not forget, however, that this unseen change is ever upward, and that if our relation to our fellow man is what it should be, we will find ourselves moving forward and upward with that permanent change, unconscious of the part we are playing in the great scheme.



President.

Watertown, S. D., March 1929



O. M. OLESON.

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. XVIII MARCH, 1929 No. 3

OLAF MARTIN OLESON.*

Olaf Martin Oleson came to Fort Dodge, Iowa, from Norway in 1870. After working for two years on a farm, near the city, he engaged with a druggist of Fort Dodge, James Swain, and later was employed by his successors, Messrs. Prindle & Yount. In 1875, he matriculated at the Philadelphia College of Pharmacy, graduating in 1877, and was awarded the Procter Gold Medal, and also the Alumni Gold Medal. During his stay in Philadelphia he was employed in the pharmacy of Dr. J. R. Stevenson, corner of Twelfth & Callowhill Streets. Dr. Stevenson had established a trade in herbs, which he compressed in a crude hand press, the packages resembling the machine-pressed herbs, so well known a few years later. He also was an expert in a certain branch of facial embellishment. Monday mornings were particularly busy, because quite a number of persons with black and blue marks around their eyes and other places, contracted during week-end hilarity, came to the Doctor for treatment, which consisted of a thick coat of oil paint of facial tint most artistically applied with a brush. This part of the "pharmacy" business Mr. Oleson did not engage in, as he was more interested in the prescription department; however, the Doctor told him that his treatments produced most profit.

Mr. Oleson states that his years at the College were profitable and enjoyable; that Professors Bridges, Maisch and Remington were very inspiring, and with the aid of excellent quizmasters did everything in their power to convert the students into useful, as well as capable, pharmacists. Professor Maisch had charge of the chemical laboratory; at one time during the winter, on account of illness in his family, he was absent for more than two weeks. During this period Mr. Oleson had charge of the laboratory; later, he was complimented by the students, who expressed themselves as having profited greatly by Mr. Oleson's instructions in chemistry.

* We are indebted to our fellow member W. W. Haire for the data for this sketch.

S. M. Burroughs, then with John Wyeth & Brother, was one of his class mates and a fellow graduate, and, later, a partner in the firm of Burroughs, Wellcome & Co. Mr. Burroughs was one of Mr. Oleson's most intimate and dearest friends; he did not think Mr. Oleson's room and board were quite good enough, and so he offered to share his apartment and furnish him with better meals; for this Mr. Oleson was to become Mr. Burrough's private quizmaster, and to give him any pharmaceutical information that the latter would ask for, at any time; quite a job, but it seemed to work out quite satisfactorily.

After graduation Mr. Oleson returned to Fort Dodge and engaged with Messrs. Cheney & Meservey; very soon, thereafter, the latter member of the firm sold his interest to Mr. Oleson, and the firm name was changed to Cheney & Oleson. A few years later Mr. Cheney sold his interest to his partner, when the firm was incorporated under the name of The Oleson Drug Company; since then some of the capital stock has been sold to faithful employees and it is operated at the old stand in the Company's three-story building, at the corner of Central Avenue and Eighth Street.

Mr. Oleson was one of the three members who laid the foundation for the work of the Iowa Commission of Pharmacy when it was first organized and it has been very successful ever since.

He was a member of the Iowa Senate in 1892–1898. Last fall Mr. Oleson was decorated by King Haakon, of Norway, as Knight of St. Olaf's Order, First Class, for distinguished service for humanity.

Mr. Oleson is Vice-President of the First National Bank (Fort Dodge), Director in the First Trust and Savings Bank, President of the Oleson Drug Company, the Oleson Land Company, the Fort Dodge Building and Loan Association, Fort Dodge Telephone Company, and also member and officer in a number of civic and charitable organizations. He has always been deeply interested and instrumental in the upbuilding of Fort Dodge and still maintains an active interest in pharmaceutical matters. He became a member of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1877.

The veteran pharmacist spends most of the winters in Southern California. He has always been very much interested in botany, and the "Golden State" is an ideal place for plant enthusiasts.

YALE RECEIVES MILLION DOLLAR GIFT FOR NURSING SCHOOL.

A gift of $1,000,000 from the Rockefeller Foundation has been received by the Yale School of Nursing for endowment purposes. Miss Annie W. Goodrich, who organized the school as its dean, was dean of the Army School of Nursing during the World War. She was president of the American Federation of Nurses, honorary president of the International Conference of Nurses and is a former president of the American Nurses' Association, as well as former Professor of Nursing and Health at Columbia University and former director of the Henry Street Visiting Nurse Service.

A SOVIET ENCYCLOPEDIA.

The Russian Academy of Sciences has recently announced that Tome I of a new "Soviet Encyclopedia" is about to be published. This volume will contain, according to the Academy, everything from Aa to Vanilla. Soviet savants, with all their literary reforms, neglected to reshuffle their alphabet, thereby leaving the Russian V third in the order of sequence. B is the second letter, however, and is fully represented.

EDITORIAL

E. G. EBERLE, EDITOR 10 West Chase St., BALTIMORE, MD.

PUBLICITY FOR PHARMACY.

DURING recent years pharmacy has received publicity which has been most helpful in acquainting the public with its mission, its organizations and activities. Radio talks delivered by pharmacists have held the attention of the "listeners-in" and, in some localities, they have requested an extension of the series of such talks, thereby exhibiting their interest.

Good publicity in the press and literature is giving the laymen a better understanding of what pharmacy means and they are gaining a higher appreciation of its importance, which stimulates their interest beyond the mere going to the pharmacy for medicines—instilling a realization that pharmaceutical education is of great importance to them, because they are given a most valuable service and are safeguarded. They are beginning to understand what it means to have standards for medicines; that there is such a thing as scientific dispensing, that drug handling and preservation mean very much more than simply storing. They are also becoming better acquainted with the importance of pharmaceutical education and the place of pharmacy and pharmacists in Government service, in commerce and community life.

This comment is made for the purpose of commending and encouraging those who are aiding in good publicity for pharmacy; every form of social, religious, educational and business activity is promoting such work. Pharmacy is being strengthened by renewal of faith in its ideals and a greater realization of the value of service; the members of the profession have a profound sense of their responsibilities to the public.

THE PHARMACY CORPS BILL.

THE Bill for the establishment of a Pharmacy Corps in the Army has made progress to the extent of a Hearing before the Committee on Military Affairs of the House. The brief presented and an account of the Hearing will be found under "Committee Reports" and, therefore, no extended comment will be made in these columns; however, on behalf of the ASSOCIATION thanks and appreciation are expressed for the hearty coöperation of Congressman Kelly and Senator Copeland, of all State and National Associations and the splendid coöperative publicity given by the Pharmaceutical Press. Copies of the Hearing are now being printed and will be available for those who desire them, by addressing the Government Printing Office, Washington, D. C. The Committee will continue its efforts in behalf of the Bill, with a determined purpose to succeed.

It has been shown that there is need for pharmaceutical service, that inadequate service endangers the health and life of the soldiers. It is not easily understood why the Army Service of the United States, as far as pharmacy is concerned, should not be up to the highest standard; at least, measure up to pharmacy in civil life. Whether the surmise is correct or not, there seems to be an underlying

purpose, in some quarters, to hold down pharmacy, instead of encouraging those who are sincerely desirous of elevating the profession, and are doing so. Those who would hinder the advances of pharmacy will, in due time, be given an opportunity to give their reasons and applying them, reversely, to themselves. In the meantime Congress and the public generally will be made acquainted with conditions as they are and have been, and what these mean to the men in the Service. The *N. A. R. D. Journal* closes a comprehensive editorial as follows:

"Having made an excellent start in this most commendable program, every effort should now be brought to bear to enlist coöperation and support of all branches of pharmacy and the drug trade in pushing this issue to a successful conclusion and to this end the *Journal* pledges its earnest and untiring support."

"FOR THE GOOD OF THE PUBLIC, PHYSICIANS AND PHARMACISTS MUST WORK IN HARMONY."

AT the February meeting of the Philadelphia Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION, attended by members of the County Medical Society, Dr. E. J. Beardsley, professor of Clinical Medicine in Jefferson Medical College, said: "Pharmacy, at its best, is a true profession;" physicians expect pharmacists to be men of character, gentlemen and expert business men, and, he contended that "for the good of the public, physicians and pharmacists must work in harmony; selfishness and self-interest ruin the relations that should obtain between physicians and pharmacists."

The interests of physicians and of pharmacists are largely common interests, the work of one branch of medicine is incomplete without the other, and the fullest measure of success is possible when their service is directed for the welfare of the public; this implies that the value of human life and health should be above class distinction and selfish motives.

Other physicians contributed to the evening's program whereby the value of joint meetings of physicians and pharmacists was emphasized. The relation should be expressive of confidence which strengthens the confidence of the public in the practice of medicine and of pharmacy.

Only an unwilling person can fail to note the progress of pharmacy as evidenced by the schools and boards of pharmacy and no reasonable person will deny that the progress of medicine is dependent on the coöperation of the related professions, and that pharmacy is made increasingly helpful by encouragement that signifies belief in one another. Examples seem to us unnecessary but we cite a recent report in the London *Lancet* on a case of poisoning which emphasizes one phase of coöperation. We quote, in part: "It is reasonably clear, however, that the mistake would not have occurred if the original prescription as written by the anaesthetist had actually reached the dispenser who was a qualified chemist and druggist. . . . Both the doctor and the patient are well served by the pharmacist's experience in interpreting prescriptions, and no prescriber would be willing to forego the safeguard of the dispenser's expert and often critical eye."

While the foregoing presents a very important phase, a general application of coöperative effort and research is more significant, and the daily practice of medi-

cine and pharmacy testifies that success and progress have been achieved through coöperation. A deduction can be made that the votaries may work together for the common good, but each class is best qualified to render service in the department for which the individuals have been trained by experience and education; the success of one is dependent on the advancement of the other.

AMMONIUM SALT OF ACETYL SALICYLIC ACID.

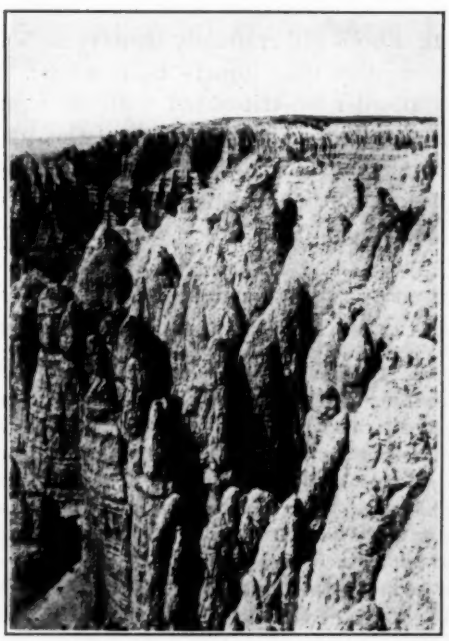
BY M. N. DVORNIKOFF.

A recent publication by N. E. Woldman (JOUR. A. PH. A., XVIII (Jan. 1929), 14) describes a method of making the ammonium salt of acetyl salicylic acid.

Following Woldman's procedure, 1 mol. of aspirin was dissolved in 1 mol. of 9.5% NH_3 solution at 60° C. (It is assumed that a typographical error occurred on page 16, where percentage of concentrated ammonium hydroxide is given as 94% and that it should read 24%.) On cooling the solution a white crystalline product was obtained. This was not, however, the ammonium salt of acetyl salicylic acid as claimed by Woldman but proved to be the free aspirin contaminated to a small extent with ammonium salts.

Aspirin is soluble in ammonium hydroxide solution and is hydrolyzed by the excess of ammonia under formation of ammonium salicylate and ammonium acetate (or, perhaps, acetamide). The hydrolysis takes place very readily, and by the addition of aspirin to a solution of ammonium hydroxide the consumption of ammonia approaches the ratio 2 mols. of NH_3 per 1 mol. of aspirin. When all the NH_3 is neutralized and more aspirin is added to a warmed solution, the aspirin simply goes into the solution and separates out unchanged on cooling.

LABORATORIES—MONSANTO CHEMICAL WORKS,
ST. LOUIS, MISSOURI.



One Wall School of Mines Canyon, Bad Lands, S. D.

"Hells Half Acre," Bad Lands, S. D.

SCIENTIFIC SECTION

GENERALITIES OF SOLUTION.*,[1]

BY JOHN URI LLOYD.

Before introducing the meniscus subject promised in the closing paragraphs of the article titled "Solvents in Pharmacy" (following "Solvents in Pharmacy," JOUR. A. PH. A., 1918, 145[2]) it may be well to consider some of the generalities of solution.

The physical dilution of matter by separation of its molecules through the agency of a solvent is one of the constants of solution. Usually liquids are the diluents or solvents, which in taking up other substances transform them, if liquid, into a more diluted liquid; if solid, into the liquid state. Liquids, gases and solids may thus severally be dissolved in and distributed throughout the liquids. For example, water will dissolve oxygen gas, chloroform or sugar. Such solutions are apparently the result of physical phenomena, the components of the product retaining to a degree their individual characteristics.

The action of a liquid is not, however, essential to liquefaction (solution) of a solid. It is possible to induce two volatile solids to dissolve each other and produce a fluid. Thus, equal amounts of chloral hydrate and camphor, if rubbed together, will form a liquid, the reaction at the start being due to the *vapors* of these substances acting on each other. Combining, these vapors form a liquid film over each solid particle, establishing thus a common solvent, and then as vapor is absorbed the liquid increasingly dissolves both substances. This is illustrated by placing a piece each of chloral hydrate and of camphor near each other under a small beaker glass, when it will be observed that both will gradually liquefy.

Where only one substance is volatile, admixture may liquefy both solids. If di-berberine sulphate (not volatile) in dry powder be triturated with an equal amount of thymol, the two powders form a paste.[3] The chemistry of this phenomenon has not, to my knowledge, been established. A seeming similarity is shown when vapor of water is absorbed by, and ultimately dissolves chloride of calcium or acetate of potassium. In this case chemical reaction seems to be involved, because of the definite hydrates produced.

Another class of solutions may be produced by two non-volatile bodies. When materials containing water of crystallization, capable by re-arrangement of forming

---

* Scientific Section, A. PH. A., Portland meeting, 1928.

[1] These general remarks may seem afar from manipulative plant pharmacy. And yet, do not law and rule apply as directly to vegetable structural complications as to separate definite chemicals? In introducing these general remarks no claim is made to originality, the aim being simply to connect some phases of plant pharmacy with established phenomena. The notes were made in and close following 1879 (written in 1885), the intent now being to make no alterations, even some glaring defects under present views being untouched. In a few cases as where Wolfgang Ostwald and Dr. Seidell have been credited, slight additions have been made.—J. U. L.

[2] Part I of "Solvents in Pharmacy" is printed in JOUR. A. PH. A., VI (1917), 940–949; Part II in VII (1918), 137–149, and a letter from Dr. Wolfgang Ostwald on the subject in XVII (1928), 820.

[3] The ordinary mono-berberine sulphate will not produce this reaction.

an anhydrous salt, are triturated together, liquefaction may result. Thus crystallized acetate of lead and crystallized sulphate of copper, in equal amounts, powdered together, change into a paste consisting of a solution of acetate of copper and suspended sulphate of lead.

These examples illustrate that it is not possible to restrict the term "solvent" to either a liquid dissolving a liquid or a liquid dissolving a solid.

Substances in solution may increase the power exerted by a solvent over other substances. Thus, citrate of potassium added to water increases its solvent power for ferric hypophosphite as well as a few other ferric compounds.

A contrary action sometimes occurs with solutions of other salts, the liquid becoming less a solvent and capable of throwing out of solution materials previously dissolved.[1]

Double salts of different solubilities may be formed, as when slightly soluble corrosive sublimate, and ammonium chloride are triturated with water, the result being a soluble double salt.[2]

As a rule, individual relationships concerning solubilities of different substances in different liquids can at the present time be determined only by experiment, a fruitful opportunity for serviceable investigation.[3]

As a rule, hot liquids are better solvents than cold ones, and heat also usually furthers chemical change, the results being often complicated when viewed from the solution aspect. Physical or simple solution of solids is accompanied by decrease in temperature, as when Glauber's salt dissolves in cold water.[4] Solution complicated with chemical alterations, on the contrary, seems generally to be accompanied by increased temperature, as when calcined magnesia "dissolves" in solution of citric acid. In many cases, the act of solution is accompanied by the molecular combination of some of the water with a solid, as, on dissolving, caustic soda progressively combines with water to form solutions of higher hydrates with the liberation of much heat. Often also the term "solution" is applied to chemical reactions in which solid substances in the presence of reagents, change their conditions chemically, at the same time becoming liquid. Thus, diluted hydrochloric acid is in popular terms said to dissolve iron, when in reality the iron and the acid both disappear, as such, in the ensuing chemical reaction, the result being a solution of

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[1] Possibly another phase of the problem rests in the fact that the terms solid and liquid may depend upon temperature only. Thus water becomes a solid when viewed from a temperature below 32° F.

[2] In 1865 Dr. W. B. Chapman, under whom this writer served as an apprentice, theorized that this solution could replace alcoholic solution of corrosive sublimate as a bedbug poison. To his surprise parties using it decided otherwise.

[3] Again I beg to say that although the pharmacist is in business for a living, that very "business" makes it a necessity for him to perform experiments that come to no other man. To record observed facts, to extend research beyond the business phase of the subject, is both a pleasurable opportunity and a professional duty. It is his right to retain to himself results that would injure his business if published, but the larger share can be given to the world. Even the retention of a private process necessary to his success is a gift to the world. Is it not easier for an imitator to follow where a path is made than to make an original exploration?

[4] To study this subject now (1918) would much change as well as amplify this sentence.

Ostwald: *Decrease* in solubility with *rising* temperature is also known, for instance, with calcium sulphate (above 40° C.) or better still calcium butyrate, calcium caprylate, calcium malonate or water + diethylamine. (Personal letter to the author, 1928.)

chloride of iron, a new substance. Taking it altogether, these illustrations are sufficient to indicate that the term "solution" as employed in pharmacy may be either precise or very elastic.

From the foregoing citations and brief definition of the general term, let us turn to a consideration of the solvent relationships of liquids, which in pharmacy are denominated as *solvents*.

Inter-action of Liquids as Solvents.—It is found that the liquids concerned as solvents seem not always to obey a definite rule in their deportment toward each other, but may show unexpected, and as yet unrecorded differences, regardless of their molecular constructions. Some of them will mix in any proportion, but others take each other up in very small amounts. Although they can be formulated into convenient classes that, as a rule, mix with liquids of related compositions, yet here and there, in attempted classifications unexpected exceptions occur.[1] As examples, I am not acquainted with any neutral liquid with which alcohol will mix in all proportions, from which methyl alcohol recoils. Any liquid, so far as I know, that will mix in all proportions with sulphuric ether, will do the same with acetic ether. The exceptions that occur to these rules, if there be any, I have failed to locate, provided both ethers be water-free.[2] Upon the contrary, while glycerin and water are usually paired, they inexplicably and unexpectedly are distinguished by acetone, which affiliates freely with water, and yet refuses to mix beyond a certain proportion with glycerin. And yet acetone in turn mixes in all proportions, so far as I have found, with all other liquids with which glycerin affiliates. This fact seems the more remarkable when we consider that acetone comes nearer to being a "cosmopolitan" liquid solvent (absolute alcohol excepted) than any other liquid known to me.[3] Most neutral liquids, excepting some of the paraffin series, mix with it in all proportions—a problem that furnishes an excellent subject for pharmaceutical investigation.[4]

Miscibility of Liquid Solvents.—In studying more carefully the line of solvents cited in this series[5] chemical constitution seems not as yet to offer an opportunity to classify them into systematic groups. Methyl and ethyl alcohol are widely separated in solvent powers from glycerin, which is also an alcohol. Benzol and benzine mix with all hydro-carbons, and yet other members of the hydro-carbon series do not all mix with solvents that unite freely with these liquids, as, witness in the deportment of liquid petrolatum which repels or is repelled by acetone,[6] al-

[1] See "Solvents in Pharmacy," JOUR. A. PH. A., VI (1917), 940.

[2] In the experimentation to follow, this water problem in ethers assumes importance by reason of discordant results otherwise unexplained.

[3] And yet it has destructive powers, as well as solvent. Within a very short period it will utterly destroy the very stable alkaloid sanguinarine. I touch acetone very cautiously in plant pharmacy.

[4] One of these problems is the decomposition of acetone by substances dissolved, as well as the composition of resultant products.

[5] Fourteen liquids are now studied as solvents: glycerin, water, alcohol, methyl alcohol, acetone, chloroform, amylic alcohol, acetic ether, sulphuric ether, benzin and benzol, carbon disulphide, oil of turpentine, petrolatum and liquid petrolatum.

[6] Likes and dislikes are mutual. We are prone to consider the most prominent substance, to the neglect of the "minority."

Ostwald: *Solvent Power of Acetone.*—In the modern electronic theory of matter, especially in the so-called "dielectric theory of liquids" by P. Debye and others, acetone has a rather ex-

though the latter affiliates freely with either benzol or benzin, with both of which liquid petrolatum also mixes, in all proportions. Bisulphide of carbon and chloroform are not related chemically, and yet are close companions in their solvent attributes as concerns the present series of solvents, the companionship extending to many other liquids. Other examples might be cited to illustrate, perhaps even more forcibly, the opportunity for research presented in the solvent relationships or deportments that exist between liquids.

Attempts at Systematization.—Is any known alcohol insoluble in ethyl alcohol? Acetic acid dissolves all organic acids I can now recall, with, however, the exception of gentisic acid.[1] The normal nitrates generally, even the nitrates of the alkaloids, are quite soluble in water; but nitrates of berberine, chelidonine and sanguinarine to a lesser degree, are exceptions. Watts states that "Solubility in water of the nitrates of the alkali metals decreases as the atomic weight of the metal increases," but yet no rule, so far as I am aware, has been announced by which a quantitative solubility of even one of these nitrates in any untried solvent can be accurately predicted. As examples of our dilemma, it may be stated that strontium nitrate is insoluble in alcohol, while calcium nitrate is soluble. In this direction the following from Mendeleef is pertinent: "The platinochlorides of lithium and sodium are soluble in water; those of potassium, rubidium and caesium are sparingly soluble, and the greater the atomic weight of the metal, the *less* soluble is the salt. (Note, Watts Concerning Nitrates of Alkali Metals.) *In other cases the reverse is observed.*[2] The greater the atomic weight, the more soluble are the corresponding salts." These generalizations are scientifically inadequate, as applied to plant structures, for as yet no method has been devised to enable us to arrive by calculation at the *quantitative* solvent power of any organic substance, at any temperature, in any solvent. The statements seem to be applicable only as preliminary generalizations, the details of which must be established experimentally. In this field empiricism dominates, and pharmacy is the field that engulfs the purely scientific man concerned in the study of plant structures.

Chemical Analogies.—Chemical analogies, however, sometimes approximately classify chains of solubilities, Wilhelm Ostwald stating that most alcohols dissolve in water more freely as the carbon in their molecules decreases, and also that—

> "The replacement of hydrogen by hydroxyl (OH) in the molecule of benzol (benzene 1918) C_6H_6, increases the solubility of the compound."

Thus he draws attention to the fact—

> "Benzol (benzene (1918) C_6H_6) is insoluble
> Phenol C_6H_5OH dissolved in fifteen parts of water
> Hydroquinone $C_6H_4(OH)_2$ is more soluble."

In this connection it is probably of interest to compare solubilities of hydroxides of metals in relation to their atomic weights.

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ceptional place too. It has an enormous "dipole momentum," by far the greatest of all common solvents, much greater than water, alcohols, ethers, benzol, benzine, chloroform, etc. It is, from the electronic point of view, a very "active" substance. (Personal letter to the author, 1928.)

[1] Accepting that it is a true acid.

[2] Italicized by me.—J. U. L.

The following table for which the data were obtained from Dr. Atherton Seidell,[1] "Solubilities,"[2] indicates a relation the reverse of that stated by Watts for the nitrates of alkali metals mentioned above:

SOLUBILITIES.

Hydroxides.	Atomic wts.	Temp.	100 Gm. of water plus.	100 Gm. of solution contain.
LiOH	7	20°		10.99 Gm.
NaOH	23	20°	109 Gm.	52.2 Gm.
KOH	39	20°	112 Gm.	52.8 Gm.
$Mg(OH)_2$	24	18°	0.0008 Gm.	
$Ca(OH)_2$	40	20°	0.165 Gm.	
$Sr(OH)_2$	87.6	20°		0.851 *
$Ba(OH)_2$	137	20°	3.89 Gm.	3.74 Gm.
$Fe(OH)_3$	56		Insoluble	

* Calculated for $Sr(OH)_2$.

It is noted that with molecules having the same number of OH groups, the solubility rises with increasing atomic weight of the metal.

Contrary to the rule Ostwald applies to phenols, the increase in the number of OH groups is marked by decrease of solubility.

May we not, indeed, go a little further, without digressing from our subject? Potassium chloride and platinum chloride are both water soluble, and yet the double chloride of platinum and potassium is practically insoluble. So far as I know, no rule has been evolved to indicate in advance of experiment such exceptions.

But in plant pharmacy, we have even greater exception problems. The "potash" salts are, as a rule, very soluble in water. And yet, in plant textures, potassium is held so tenaciously as to forbid its total extraction by water. This union is shown in corn cobs, which hold a decided percentage of potassium (calculated to KOH) the ashes of corn cobs being largely potash KOH and K_2CO_3. Successive boilings of ground corn cobs in large amounts of water fail to extract the final proportion of the potassium textural compound.[3]

As yet the empiricist in this and a multitude of other directions connected with vegetation must accumulate data to be later utilized by the unknown party destined yet to correlate the research fragments and formulate them into a compre-

Ostwald: (Wolfgang), personal letter to author. No question but that the rule given by Wilh. Ostwald is meant to be a "Handregel" (rule-of-thumb) for a certain simple set of *organic* compounds. Real extending *laws* are not known even now (cf. V. Rothmund, Löslichkeit u. Löslichkeitsbeeinflussung, Leipzig, 1907, 196; J. Hildebrandt, Solubility, about 1902; Monographs edited by the Amer. Chem. Soc. or Chem. Catalogue Company, New York); those are the most comprehensive, theoretical treatises on solubility.

[1] Table and term "benzene 1918" added in 1918.—J. U. L.

[2] The research placed by Dr. Seidell on this subject is phenomenal. This publication is one of the greatest offerings made in recent years to connected literature. Had it been attainable in 1879, this writer would have been saved much wandering and, undoubtedly, many errors both of fact and theory.

[3] The term "textural" is employed because, so far as I know, the natural compound is unknown.

hensive whole. But we can make a stagger by considering the qualities of the three classes of liquids given on page 137, JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION (1918), reproduced as follows:

The extremes (Classes 1 and 3) being diametrically opposed to each other, neither mix with nor dissolve each other, nor do they dissolve the same classes of bodies. Few substances soluble in the 3rd class will dissolve in the 1st. Hence it is that in galenical pharmacy, if the active principles of a drug are wholly soluble in water, the drug may be freely abstracted of many of its needless extractives by the sixth class of solvents as a preparatory step without detriment to its therapeutical value providing the solution formed be not a solvent for the constituent desired.

Considering that the proximate principles of drugs are admixtures of various constituents, it would seem possible to abstract or exclude one or more of them as we may desire by a study of the application of these natural solvents. Thus, the qualities of menstruums that may be made by a judicious mixing of these classes approach infinity. This object, too, should seemingly be accomplished without the application of any destructive or heroic chemistry. Beginning with the extremes of the classes mentioned, we have liquids that neither affect each other nor dissolve the same substances. Progressing toward the means in each case, we have liquids that as a rule affiliate with those bounding them, but yet present marked characteristics and differences from the further separated classes. There are, however, a few conspicuous exceptions as, for example, the affinity that benzol bears for members of the first class, and the indifference that acetone exhibits for glycerin. These very exceptions may, however, be made to serve a useful purpose in pharmaceutical manipulation.

It should be possible with selections of these liquids to wash out inactive substances from a powdered drug by the judicious adoption of the right menstruum providing the inert and active principles present different solubilities. The operator may, indeed, first abstract the desired principles in connection with others objectionable, and afterward by appropriate solvents and excluders separate those objectionable.

Two or more liquids may be combined so as to enable the product formed to present solvent actions that are very different from either of the originals, and the solvent powers may be altered (graded) time and again by such methods. A percolate made of one solvent may be dissociated by the use of others added in progressive steps and the dissolved matters first abstracted thus broken into fractions by a judicious admixture of other neutral solvents. Thus we may successively throw out of solution or dissolve at will, without using chemicals, the various constituents that are now classed together among plant products under the general name, extractive matter. This, I believe, is the true foundation of a coming study in galenical pharmacy. In this direction we are again led to the phase of the act of solution that confronted us when we considered the value of water as a solvent. So far as the writer can observe, the principle in each is identical with the other. Although well known in its application to mixtures of neutral solvents and definite chemicals, it has been overlooked where successive menstruums operate on a mixture of plant constituents.

To resume. Mix any two solvents, *e. g.*, alcohol and water, and the solvent action of the resultant liquid is different from the original. Add, successively, other

liquids and with each addition the solvent power of the product is altered. Change the proportions of the ingredients and successive alterations in solvent power, that seem to defy calculation, result. It is possible by this means to make a solution of one liquid in another and then by adding a third liquid to throw one or the other out of solution; in other words, to precipitate it. In like manner new liquids may be added and thus liquid precipitate after precipitate may be produced in turn, perhaps to finally all redissolve when the conditions are right. Each new liquid is a menstruum, each menstruum a separate solvent having distinct qualities, as is shown by the successive precipitates.

Now refer to the solution of plant constituents (see page 217). Each substance that the menstruum dissolves becomes a liquid, the new liquid dissolves another body and thus a new liquid results. A third substance now dissolves, and with the change a third solvent springs into existence. We have a complex liquid exactly as though we had mixed various solutions together. This third liquid may not be able to hold in solution a substance that when first dissolved helped to form the first liquid. Part of this body may finally be thrown out of solution and when it is out of solution it resumes the solid form. It precipitates (insoluble) and alters the solvent by so doing. There is no reason why we should draw a distinction between the precipitates in this case and a precipitate that results when water is added to a mixture of alcohol and chloroform whereby the chloroform is precipitated. Thus we are led to the unfolding depths and questionings that now appear before us.

Can the scientific reasoner as yet predict quantitatively in water alone, much less other solvents, the solubility of any newly discovered alkaloid or its salt? He can reason from analogy, arguing that similarly constituted bodies behave so as to make it probable that the substance under consideration behaves likewise. But, can he demonstrate the amounts by any rule? Dare he predict quantitative amounts? Let us cite:

Ammonio-sulphate of copper in water dissolves cellulose. This fact was discovered by experiment, and so far as science is concerned, could not to the present day have been predicted by law or analogy. Pyroxylin (gun cotton), U. S. P., 1860, dissolves in ether. Is there any constitutional or other rule to indicate why it should respond to this agent, and be practically insoluble in alcohol? To follow this thought leads to complications innumerable. And yet we in pharmacy everywhere are confronted by such facts as these. When we search for the undercurrents in many features of solution phenomena as applied to pharmaceutical processes, as has been shown, they spring up and multiply in all directions. We must patiently experiment, fail in result, mistake in theory, err as a rule, and be contented in the passing along if here and there we find a sliver of value.

In this field of empirical exploration, pharmacists by reason of uncertainties are at home. Surely it is a field of entanglements. The problems connected with molecular chemistry are much easier to solve because in the section of galenical pharmacy even a foundation upon which to stand is wanting. The writer ventures to assert that no observer has as yet presumed to record the possibilities that may follow the uses of the several members of the three classes of solvents that are herein classified (see JOUR. A. PH. A. (1917,) 11) as they may be applied to any existing drug in any order, beginning with the most simple combination. Reverse the order selected and, as has been shown, the conditions are altered. Can any

mathematician establish the number of possible combinations these menstruums may make with the soluble constituents of a single plant?

And yet, unless an attempt is made at systematization, we will forever remain empiricists, struggling without a law and working without a rule. This we are practically doing now in official galenical pharmacy. Any thread of thought that suggests itself by reflections such as these affords abundant experimental opportunity. Let us then pass into the study of solution as restricted to one phase that confronts pharmacists.

Plant Constituents.—In a vial before me an organic[1] proximate principle rests. Following the example of most alkaloids, we would naturally accept that its salts are more soluble than the alkaloid. But this alkaloid, berberine, chances to be one of the exceptions for it is quite soluble in water, its salts variably so, the nitrate especially being unexpectedly quite insoluble. The constitution, the origin, the alkaloidal relationship, throw little if any light concerning its behavior.

Pass to solubilities quantitative as applied to classes of proximate plant principles. Comparisons of different solvents become of no predictive value. Even the most familiar inorganics mystify us. Let us take as an example chloride of sodium to contrast with organic bodies. The relationships that exist between common salt and water could have been demonstrated quantitatively only by experiment. Who, therefore, will venture to predict the solubility quantitatively of this salt, in any other liquid, for example nitrobenzol? Who, from the voluminous literature on the substance, as well as the rules concerning temperature and vapor pressure could establish its quantitative solubility in the following well-known liquids:

Alcohol, Methyl Alcohol, Amylic Alcohol, Glycerin.

Acetone, Acetic Acid, U. S. P., glacial, Acetic Acid, Ammonia Water.

If we are in darkness concerning such a well-established substance as common salt and the most familiar liquids, what can we expect of recondite, organic solutions?

Can any reader of this page take the data at his command by either experimentation or in science reasoning, and therefrom estimate the quantitative solubility of any alkaloidal salt or any other alkaloid, glucoside or organic body, in any untried liquid? In this field is not empiricism yet our master? Those who propose to establish the solvent power of a liquid or the solubility of a solid, must necessarily utilize experimentation. Here the scientist and the empiricist meet on common ground. Here we find an illimitable field for the experimenting pharmacist, with time to devote (waste?) or to utilize, view it as he may.

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[1] This article was written before the pharmacist or physician concerned himself in animal serums. The term organic in this publication refers to vegetable products.—J. U. L. (1918.)

Ostwald: True enough, that no one can to-day "establish the quantitative solubility of NaCl" in the well-known liquids used as solvents. Until now we know only rules of mostly rather limited applicability. One factor which certainly has something to do with solubility is the "dielectric constant" of liquids, another, the "dipole momentum" a value derived from data on dielectric constant, specific gravity and refraction of the liquid.

So-called "polar" substances, for instance, *electrolytes* are frequently dissolved to a greater extent with increasing value of the dielectric constant, for instance:

Tetraethylammonium iodide $N(C_2H_5)_4I$ at 25° (salt crystallizes, etc.), P. Walden, *Z. physik. Chem.*, 61 (1908), 633.

Solvent.	Solubility molar per cent.	Dielectric constant.
Water	3.32	ca. 80
Nitromethane	1.16	ca. 50–40
Acetonitrile	0.618	36
Nitrobenzol	0.203	32
Propionitrile	0.214	27
Ethyl alcohol	0.201	27–26
Benzonitrile	0.181	26
Acetone	0.0718	21
Acetophenone	0.0594	18.6
Amyl alcohol	0.0305	15.0
Paraldehyde	0.0189	ca. 11.8
Methyl-formate	0.00751	8.9
Bromobenzol	0.00369	9.8–5.3

This does *not* hold at all for "nonpolar" substances like many organic compounds, for instance, naphthalene.

The close connection between dielectric const., dipolemoment, and general character of solvent represented by J. U. Lloyd's experimental series of solvents (JOUR. A. PH. A., VI (1917), 940–949, and VII, 137–149) has been pointed out before (letter from Dr. Wolfgang Ostwald, JOUR. A. PH. A., XVII (1928), 820).

To the data that are being collected as a contribution toward scientifically establishing forthcoming opportunities of him competent scientifically to collate observed facts and phenomena, pharmacists or men of pharmaceutical outgrowth have already contributed liberally, and in this field will surely continue their usefulness if they credit their forebears.

The Term Soluble vs. Insoluble as Applied to Liquids.—And now we may well inquire what we mean by the terms *soluble and insoluble*, used so freely. Probably every liquid will dissolve traces of all other liquids, even though some solutions may approach emulsion or micro-dispersions. On digesting the fixed oils and fats with water, filtering and then evaporating the transparent filtrate, films of grease remain on the glass. Is there any exception? Carbon disulphide, benzol, turpentine, chloroform and similar liquids, if digested with glycerin, filtered and evaporated, leave films of glycerin. Water and liquid petrolatum (paraffin oil) shaken together and permitted to separate transparent at 70° F., by standing ten or twelve hours, precipitate (turn milky) on cooling, showing that each liquid has dissolved something from the other that is less soluble at a low than a high temperature. Probably if we were to confine ourselves to ultra-fact, we might be unable to use the term *insoluble* in connection with any pair of liquids.

A series of liquid solvents, could we establish the exact location of each member, might progressively pass from such contradictory opposites as liquid petrolatum *vs.* water (practically indifferent to each other), to others like alcohol and water that are miscible in all proportions. It would be difficult to establish a break in the slant of the line that could be drawn between extremes embracing liquids classed as soluble and those called insoluble.

Mutual solubility is markedly characteristic of all neutral liquids that evaporate, it being impossible for such to be insoluble, since the vapors of a volatile liquid penetrate hostile liquids. And yet even here it is necessary to use the two terms. Consequently in our present series of studies, the term *soluble* will be employed

where a liquid perceptibly takes up another, the term *insoluble* being applied where no appreciable amount of a liquid is transferred under ordinary conditions.

Solution of Gases.—While a gas will dissolve in or mix with all other gases in any and all proportions providing they do not combine to form new compounds, and is also more or less soluble in most liquids, the amounts taken up depend on the nature of the liquids, the pressure, container and temperature. The relations that exist between the solvents and the gas dissolved thereby, which govern the solvent power of liquids are not yet understood, but science seems gradually to be approaching the solution of the problem. True solutions of gases are those in which chemical combination does not take place and in which removal of pressure or boiling expels the dissolved gas. There seems to be no great distinction between the solution of a gas in a fixed liquid and that of a solid (as sugar in water) in a volatile liquid, excepting that the participants reverse themselves. In the one case the substance dissolved (gas) is the more volatile, while in the other it is the solvent that may be evaporated. In both cases, evaporation of the more volatile substance separates the bodies more or less completely.[1] When, however, as is true of some liquids and gases, a gas unites chemically with the liquid, the result can no longer be considered a solution of the gas.

Two or more gases in solution in liquids seem not to interfere materially with each other, providing they are chemically indifferent. Each appears to be unaware of the presence of the other. Thus it is that when a liquid dissolves several gases, each gas will be dissolved in as great an amount as if no other gas were present. When gases dissolve in liquids, if chemical change occurs, heat is liberated and then (for example, in making ammonia water) the vessel that contains the liquid into which the gas is passing must be cooled.[2] All liquids seem to take up larger amounts of a gas at lower than at higher temperatures, every gas being soluble to a greater or less extent in every liquid.

Solutions of Volatile Liquids.—Every volatile liquid is probably soluble at ordinary pressure in every other cold liquid even if it be only to the extent of the vapor absorbed. If there be no chemical change, which point is sometimes difficult to determine, it is possible by distillation to separate the dissolved vapor of a volatile liquid from a liquid fixed or less volatile. In this paper the term *vapor* in these cases is therefore used as being synonymous with the term *gas*.

Volatile Liquids May Therefore for Our Purpose Be Considered as Condensed Gases.—If under atmospheric pressure the temperature of our atmosphere were increased to 100° C., water would, under this view, be a gas. If the temperature were 37° C. we would consider sulphuric ether as a gas; at 78° C. alcohol would be a gas; at 47° C. carbon disulphide would be gaseous. It is seen that the physical condition of these bodies becomes for descriptive use, simply a question of pressure and temperature (neglecting the critical point) and as volatile liquids are in this sense condensed gases, their vapors should obey the laws that govern gases. When a gas is liquefied by reduction of temperature, it becomes a volatile liquid and if a volatile liquid is vaporized, it becomes a gas. The ordinary condition of these bodies

[1] When we reach the surface film under capillarity, problems arise, theoretical phases needless to mention here.

[2] If $NH_3 + H_2O = NH_4OH$ chemistry is involved. If it forms NH_3H_2O, a solution of NH_3 results.

determines the manner in which they are classified, the distinctions between the classes being dependent on temperature and pressure.

Vapors of Volatile Liquids Are Miscible.—If volatile liquids are gases condensed, the vapors of volatile liquids that do not unite chemically should commingle in all proportions and so far as I am aware, they do so.

As an example of the series of solvents herein considered, water, according to this word, included as a member of Class 1 (see JOUR. A. PH. A., VII (1918), 137) may be considered typical, and described in part as follows:[1]

It mixes in all proportions with glycerin, alcohol, methyl alcohol and acetone, which liquids (excepting acetone and glycerin) affiliate freely with each other and constitute Class 1.

It mixes in varying proportions, but less freely, with chloroform, amylic alcohol, acetic ether and sulphuric ether, which liquids affiliate freely together and constitute Class 2.[2]

It is practically insoluble in benzol, carbon disulphide, benzin, turpentine and liquid petrolatum (paraffin oil), which liquids affiliate freely together and form Class 3.

The fact is, however, that each member of any of the three classes will dissolve more or less, precisely speaking, any member of the entire series, even liquid petrolatum, U. S. P. ("insoluble in water") yielding, under proper manipulation enough of its substance to water to demonstrate that it is not absolutely insoluble in water.

Having in this way briefly, though inadequately, referred to the "generalities of solution," I shall later comment on some of the qualities of the fourteen solvents forming types of the three classes of solvents aforenamed.

HOSPITALIZATION BILL CONSIDERED IN COMMITTEE.

The House Committee on World War Veterans' Legislation, in executive session January 15th considered the Luce bill (H. R. 15921), to authorize an appropriation of $10,000,000 for improvement in hospitalization facilities to care for "the increasing load of mentally afflicted veterans and to enable the Veterans' Bureau to care for its beneficiaries in Veterans' Bureau hospitals." No action was reached.

The bill also provides for acceptance of donations by the Director of the Veterans' Bureau for carrying out the purposes of the bill and the acceptance by the President of the United States of grounds and other equipment from states and other bodies.

INTERNATIONAL INDUSTRIAL AND MEDICINAL HERBS CONGRESS, BUDAPEST, HUNGARY.

According to the Royal Hungarian Ministry of Agriculture there was held in Budapest under its auspices, from September 8 to September 12, 1928, an International Industrial and Medicinal Herbs Congress, at which 18 nations were represented. The meetings of this congress were confined to lectures and discussions. The name of the Hungarian official who supervises the cultivation, preparation and sale of all industrial and medicinal herbs cultivated in Hungary, will be furnished interested American firms upon request. (Consul General William H. Gale, Budapest.)

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[1] Some substances absorb water in enormous amounts. Be this capillary or otherwise water becomes *dry as dust.* Seemingly it is no longer water. In other cases quivering jellies result. Here we enter the realm of physics, or pseudo-solutions in which water assumes peculiar qualities.

[2] JOUR. A. PH. A., VII (1918), 137.

SODIUM AND POTASSIUM BALANCES, WHEN USED AS CITRATES IN ACIDOTIC AND RACHITIC CONDITIONS IN RATS.*

BY JOHN H. SPEER, VERSA V. COLE AND FREDERICK W. HEYL.

In the two preceding papers (1), (2) from this laboratory, we reported on the utilization of calcium lactate in diets which were alkalized with sodium citrate and with sodium and potassium citrates, using both mature rats in a state of mineral drain, and young rats recovering from experimental rickets. In both cases it was clearly shown that alkalization with citrates had a favorable influence on the alkaline reserve, with respect to calcium, phosphorus and magnesium.

Incidentally we have determined the sodium and potassium balances on those experiments and these are here reported. For the sake of reference and clarity the other base balances are included in the tables. Of course these experiments were not especially designed to establish any particular points in connection with sodium and potassium metabolism, but they have, nevertheless, a certain interest because it is important to know what advantages or disadvantages might result from the use of alkaline citrates in such moderate quantities, and in such proportions as they are frequently employed therapeutically. In almost all nutrition experiments relating to the Na:K ratio as, for example, Richards, Godden and Husband (3), there is the tendency to use very large quantities of potassium as citrate, or chloride, so that the quantities are entirely out of line with therapeutic dosage. Nevertheless one draws the conclusion that potassium in excess has a somewhat detrimental effect on the easy adjustment of the tissues to an increased alkalinity, especially of calcium. Also phosphorus balance is not favorably influenced by excessive potassium.

As stated above, these experiments were not arranged for definite conclusions with respect to sodium and potassium yet they permit a few general observations which will probably be found correct in more elaborate tests. The summative effects of balanced alkaline solutions in metabolic experiments are, of course, the combined result of a very large number of variables, so many in fact that the practical conclusion as to the best ratios to use in practice will be decided by teleological rather than laboratory methods. Yet laboratory results have a certain confirmatory value on conclusions thus obtained. In the work of Ringer, Macallum, Clarke and others on the effects of electrolytes on tissues, laboratory results are largely confirmatory of such practical conclusions.

EXPERIMENTAL.

(*1*) *Comparison of the retentions obtained using* (*a*) *sodium citrate plus calcium lactate, and* (*b*) *sodium and potassium citrate and calcium lactate on highly acidotic* (*potassium depleted*) *mature rats.*

Since the work on mature rats reported in the first paper had been completed before we decided to determine the sodium and potassium balances, it was in part repeated in order that this added data might be secured. The rats were treated in all respects as previously described, save that sodium was substituted for potassium (3), mol for mol, in the salt mixture in the basal diet, and lactose added to compensate for the resulting decrease in weight.

* Scientific Section, A. PH. A., Portland meeting, 1928.

TABLE I.—FORE PERIOD—SIX DAYS.

Rat No.	Food eaten. Gm.	Na intake. Mg.	Na output. Mg.	Na balance. Mg.	K intake. Mg.	K output. Mg.	K balance. Mg.	Ca intake. Mg.	Ca output. Mg.	Ca balance. Mg.	P intake. Mg.	P output. Mg.	P balance. Mg.	Mg intake. Mg.	Mg output. Mg.	Mg balance. Mg.	Acidity. Cc. 0.1 N Acid.
47	73	198	284	− 86	37	65	− 27	8	58	−50	214	218	− 4	25.5	23.9	+1.6	+135
5	73	197	258	− 61	37	129	− 92	8	32	−24	214	199	+15	25.5	24.8	+0.7	+135
157	66	179	275	− 96	34	52	− 20	7	64	−57	195	205	−10	23.1	24.0	−0.9	+122
6	69	187	210	− 23	35	129	− 93	8	46	−38	204	220	−16	24.1	24.3	−0.2	+128
16	45	122	173	− 51	23	56	− 33	5	50	−45	133	171	−38	15.7	18.6	−2.9	+ 83
92	34	92	116	− 24	17	79	− 61	4	47	−43	100	120	−20	11.9	15.1	−3.2	+ 63
							Experimental Period—Six Days.										
47[1]	63	873	695	+178	26	43	− 17	31	43	−13	166	170	− 4	18.9	17.6	+1.3	−201
5[2]	67	369	279	+ 88	891	750	+141	31	9	+22	179	153	+26	20.1	15.1	+4.9	−217
157[1]	55	753	606	+148	23	55	− 33	30	37	− 7	145	152	− 7	16.5	14.7	+1.8	−179
6[2]	56	308	233	+ 65	745	652	+ 93	30	11	+19	149	144	+ 5	18.8	14.9	+3.9	−182
16[1]	46	630	601	+ 29	14	37	− 23	29	31	− 2	121	126	− 5	13.8	13.8	−0.0	−149
92[2]	35	193	156	+ 37	466	427	+ 39	28	44	−16	93	114	−21	10.5	11.0	−0.5	−113

[1] Received high sodium citrate plus calcium lactate.
[2] Received mixture of sodium and potassium citrates, plus calcium lactate.

TABLE II.—DATA FOR SEVEN-DAY PERIODS.

Food eaten. Gm.	Na intake. Mg.	Na output. Mg.	Na balance. Mg.	K intake. Mg.	K output. Mg.	K balance. Mg.	Ca intake. Mg.	Ca output. Mg.	Ca balance. Mg.	P intake. Mg.	P output. Mg.	P balance. Mg.	Mg intake. Mg.	Mg output. Mg.	Mg balance. Mg.	Acidity. Cc. 0.1 N Acid.	Na/K.
78[3]	0.348	0.366	− 18	208	140	+68	226	148	+ 78	242	153	+ 89	93.6	84.8	+ 8.8	+138	1.67
72[1]	1.143	1.042	+101	192	113	+79	225	127	+ 98	223	131	+ 92	86.4	67.3	+19.1	−229	5.95
75[1]	1.156	1.060	+ 96	200	137	+63	226	97	+129	233	145	+ 88	90.0	57.4	+32.6	−224	5.80
67[2]	551	554	− 3	413	391	+22	224	149	+ 75	300	226	+ 74	94.8	76.4	+18.4	+ 17	1.34
69[2]	561	560	+ 1	418	401	+17	224	143	+ 81	306	231	+ 75	97.8	74.5	+23.3	+ 14	1.34
66[2]	547	565	− 18	410	422	−12	224	139	+ 85	296	206	+ 90	93.8	67.3	+26.5	+ 19	1.33
81[3]	344	381	− 37	218	161	+57	332	229	+103	235	150	+ 85	94.0	99.6	− 5.6	+143	1.58
81[3]	344	366	− 22	218	158	+60	332	214	+118	235	158	+ 77	94.0	93.5	+ 0.5	+143	1.58
81[1]	1.166	1.145	+ 21	218	157	+61	332	177	+155	235	121	+114	94.0	73.8	+20.2	−214	5.35
79[1]	1.158	1.085	+ 73	212	160	+52	332	181	+151	229	117	+112	91.7	76.9	+14.8	−217	5.45
82[2]	729	698	+ 31	574	517	+57	332	210	+122	379	278	+101	118	88.8	+29.2	− 48	1.27
80[2]	721	742	− 21	568	534	+34	331	192	+139	373	277	+ 95	116	89.5	+26.5	− 51	1.27
71[3]	683	626	+ 57	544	513	+31	330	192	+138	347	261	+ 86	105	79.5	+25.5	− 67	1.26

[1] Alkalized with sodium citrate alone. [2] Alkalized with sodium and potassium citrates. [3] Basal diet alone.

TABLE III.—DATA FOR SEVEN-DAY PERIODS.

Food eaten. Gm.	Na intake. Mg.	Na output. Mg.	Na balance. Mg.	K intake. Mg.	K output. Mg.	K balance. Mg.	Ca intake. Mg.	Ca output. Mg.	Ca balance. Mg.	P intake. Mg.	P output. Mg.	P balance. Mg.	Mg intake. Mg.	Mg output. Mg.	Mg balance. Mg.	Na/K intake. Mg.	Total acidity Cc. 0.1 N Acid.
73[1]	153	85	+68	235	108	+127	361	137	+224	190	72	+118	19.7	9.0	+10.7	0.65	+135
92[1]	192	141	+51	296	218	+ 78	455	219	+236	239	130	+109	24.8	28.2	− 3.4	0.65	+168
94[1]	197	131	+66	303	214	+ 89	464	175	+289	245	150	+ 95	25.4	27.2	− 1.8	0.65	+172
92[1]	192	128	+64	296	208	+ 88	455	205	+250	239	88	+141	24.8	18.5	+ 6.3	0.65	+168
62[2]	385	322	+63	200	170	+ 30	306	81	+225	162	68	+ 94	16.8	15.0	+ 1.8	1.92	± 0
92[2]	572	525	+47	296	225	+ 71	455	97	+358	239	134	+105	24.8	6.7	+18.1	1.93	± 0
92[2]	572	517	+55	296	210	+ 86	455	111	+344	239	94	+145	24.8	17.0	+ 7.8	1.93	± 0
92[3]	385	310	+75	613	473	+143	452	148	+304	242	93	+149	24.8	28.8	− 4.0	0.63	± 0
92[3]	385	308	+77	613	507	+106	452	162	+290	242	109	+133	24.8	27.6	− 2.8	0.63	± 0
72[3]	301	258	+43	480	428	+ 52	354	95	+259	191	77	+114	19.4	15.8	+ 3.6	0.63	± 0

[1] Basal diet. [2] Sodium citrate alone. [3] Sodium and potassium citrate.

In the experimental period, sodium citrate was added to the diet of half the rats at a level of 5 Gm. $Na_3C_6H_5O_7.2H_2O$ per 100 Gm. food, while the other half received 1.04 Gm. $Na_3C_6H_5O_7 2\ H_2O$ + 4.36 Gm. $K_3C_6H_5O_7.H_2O$ making the total alkalinity the same in each case. Four mg. calcium lactate per day was added in the usual manner. The Na and K analysis of the diets are:

	Basal diet.	Na citrate.	Na and K citrate.
Na	0.271%	1.37%	0.58%
K	0.051	0.041	1.33

Results are shown in Table I.

CONCLUSIONS.

(1) Addition of sodium and calcium does not conserve potassium, the balance of which is the same in both the fore and experimental periods.

(2) Addition of sodium and calcium favors calcium retention.

(3) Addition of sodium, potassium and calcium favored potassium retention, lowering to some extent sodium retention; perhaps by eliminating the necessity of sodium functioning for potassium as base.

(4) Addition of sodium, potassium and calcium favored calcium retention but too much potassium on low sodium is less favorable.

(5) We could not distinguish any difference between addition of Ca, K and Na and of Ca and Na alone on P retention. P retention has been shown to be increased if Ca level is raised (4).

(2) *Alkali retentions of young rachitic rats when alkalized with varying amounts of sodium citrate.*

The balances reported in this and the succeeding section were done on the same rats reported in the second paper of this series (2); consequently the methods and technique described there apply here also.

The control rats on the basal diet plus Ca lactate, but without any added alkali, were negative in Na, but gaining in K, Ca and P. When completely alkalized with sodium citrate, so that the ratio of total Na to K ingested was 5.9:1, Na and Ca balances were favored, while K and P were not affected. When only partially alkalized, so that the ratio of Na:K ingested was 1.3:1, the Na, K, Ca and P balances were all less favorable than with the Na citrate alone. It would appear that the increased alkalinity and the higher Na/K ration has a favorable tendency in salt balances. Data are given in Table II.

(3) *Comparison of retentions obtained as in (2) but using a different basal diet.*

The rats here reported are those shown in Table III in the preceding paper (2). This diet contained more calcium than given in Experiment 2, and its utilization is quite obviously favored where alkali was used. The increased retention of calcium in turn improves the phosphorus balances. But where the increased use of potassium has led to a greater potassium retention to meet the needs of the growing animal, the phosphorus balance continued improved while the calcium retention is materially lowered. With the exception of finding an increased retention of potassium, this experiment bears out the results of the others, in that a higher ratio of Na:K, within reason, appears to be more desirable.

SUMMARY.

1. Acidotic, depleted, mature and young rachitic rats have been treated with alkaline saline mixtures of sodium, potassium and calcium to study the more beneficial mixtures for retention of all bases.

2. Most favorable results require all the bases, but the ratios are not without an important bearing.

3. Assuming that the K, Ca, P and Mg requirements are met, the alkalization requires a considerable preponderance of sodium, our best results in this survey resulting from a mixture in which Na:K = 5.9:1. This is simply a suggestive value, indicating the nature of the proper balance. A ratio of Na to K of 33 to 1, as in Experiment 1, showed some tendencies to imbalance.

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PHYTOCHEMICAL NOTES.*†

No. 101. THE SEEDS OF MONARDA PUNCTATA.

BY A. A. HARWOOD.

About two and three-quarter pounds of seeds were gathered at Lake Wisconsin and in the Pharmaceutical Garden. The heads were thrashed and the chaff removed with a fanning mill.

The moisture content, as determined by the xylene method[1] was found to be 3.6 p. c. (two determinations).

Ash content 2.6412 Gm. and 2.7580 Gm., respectively, when incinerated as directed[2] yielded the following amounts of

	I.		II.	
Water soluble ash	0.0101 Gm.	= 0.38 p. c.	0.0169 Gm.	= 0.61 p. c.
Acid soluble ash	0.1816 Gm.	= 6.87 p. c.	0.1836 Gm.	= 6.66 p. c.
Acid insoluble ash	0.0081 Gm.	= 0.3 p. c.	0.0076 Gm.	= 0.2 p. c.
	0.1998 Gm.	7.55 p. c.	0.2081 Gm.	7.47 p. c.

Extraction with Selective Solvents.—One hundred Gm. of seeds were finely pulverized and placed in a continuous extractor for extraction with petroleum ether, ether and alcohol. The extraction with hot alcohol, acetone and methyl alcohol was accomplished in a flask connected with a reflux condenser. The

* Scientific Section, A. PH. A., Portland meeting, 1928.
† From the laboratory of Edward Kremers.
[1] U. S. Dept. Agr., *Circ.* 134.
[2] Nellie Wakeman, "Plant Chem. for Pharm. Students," page 15.

aqueous extractions were carried out in the usual manner. The amounts of extract resulting in each case are recorded. Duplicate experiments were carried out in each case.

Solvents.	I.	II.
Petroleum ether	27.7 Gm.	29.0 Gm.
Ether	0.3 Gm.	0.4 Gm.
Cold alcohol	2.2 Gm.	1.5 Gm.
Hot alcohol	0.7 Gm.	0.7 Gm.
Hot acetone	0.6 Gm.	0.4 Gm.
Hot methyl alcohol	0.5 Gm.	0.7 Gm.
Hot water	1.2 Gm.	1.5 Gm.
2 p. c. HCl solution	10.8 Gm.	10.0 Gm.
5 p. c. NaOH solution	29.0 Gm.	33.0 Gm.

The density of the combined petroleum ether extracts, as determined by means of a pycnometer, was found to be 0.9231; the refractive index (Zeiss) 1.4836 at 23°. S. V. 203.2 and 205.5, respectively. For the iodine value determinations 40 cc. of iodine solution were used in the first two determinations and 50 cc. in the remaining three. With one exception, concordant results were again obtained in this manner, *viz.*, 207.0, 207.8, 204.8, 207.3 and 208.2.

Extraction of Fixed Oil with Petroleum Ether.—The seeds were ground to a powder in a mortar, the meal packed in a reflux percolator and the fixed oil extracted with petroleum ether. Four samples of 163 Gm., 158.6 Gm., 149.3 Gm. and 150 Gm. of powdered seed yielded 33.5 Gm., 35.0 Gm., 33.8 Gm. and 37.8 Gm., respectively, of extract after removal of the hydrocarbon. These figures correspond to 20.5 p. c., 22.1 p. c., 22.6 p. c. and 25.2 p. c., respectively.

The saponification value of the oil was determined in the usual manner by heating for $^1/_2$ hour with an excess of $N/2$ alcoholic potassium hydroxide and back titrating the excess with $N/2$ hydrochloric acid. The blank was run in the same manner. The saponification value was found to be 173.3.

The specific gravity of the oil at 25° C. was 0.9100, determined with a Mohr-Westphal Balance. As became apparent from experiments recorded below, this oil contained a small amount of petroleum ether.

After the petroleum ether had been recovered, the oil was subjected to steam distillation. About 5 cc. of a greenish yellow layer were obtained. This was separated from the water and exposed. All but a few drops evaporated. A Flueckiger test for thymol, gave a negative result.

The oil was saponified with alcoholic potassium hydroxide using twenty per cent in excess of the theoretical amount necessary. After refluxing for four hours the alcohol was recovered.

The soap having cooled sufficiently, the unsaponifiable portion was extracted by repeated shakings with ether. The soap was then acidified with 1:1 hydrochloric acid and the acidified solution drawn off and set aside for the identification of glycerin. The fatty acids were extracted with ether and the ether recovered.

Separation of the Solid from the Liquid Fatty Acids.—A concentrated solution of alcoholic potash was added until the solution was neutral to phenolphthlalein. A 10-p. c. solution of lead acetate was added in excess and the mixture well stirred to insure complete formation of the lead soap. After the mixture was well

cooled, the supernatant liquid was filtered and the lead soap washed twice with hot water and finally with absolute alcohol. To insure complete removal of liquid, the soap was placed between filter papers. After the lead soap had been dried, it was placed in a larger beaker and twice the weight of ether added. The mixture was well stirred and the ether-soluble portion filtered into a separatory funnel. The insoluble portion was washed twice with ether. A 10-p. c. hydrochloric acid solution was added to the ethereal solution in the separatory funnel and the mixture shaken. The free fatty acids were thus dissolved in the ether layer and the precipitated lead chloride was removed. The solid portion was also placed in a separatory funnel with ether and 10-p. c. hydrochloric acid added and the precipitated lead chloride separated from the ethereal solution of the fatty acids by filtration.

Bromination of the Liquid Fatty Acids.—The modified method recommended by Lewkowitsch[1] was used. The ethereal solution of the free acids was placed in a two-liter Erlenmeyer flask and sufficient ether added to make the total about 800 cc., then 400 cc. of glacial acetic acid were added and the solution placed in an ice-bath.

After the solution had become well chilled, a solution of bromine in acetic acid, in the proportion of one part by weight of bromine to two parts of glacial acetic acid, was run in slowly through a separatory funnel agitating the solution well after each addition. A flocculent white precipitate began to be formed almost immediately. The addition of the bromine solution was continued until a slight reddish brown color had appeared and a faint odor of bromine was perceptible. The flask was then placed in a refrigerator for twenty hours.

The precipitate which had formed was filtered off and washed with equal parts of glacial acetic acid and ether. The white crystalline precipitate had a melting point of 180.5° C. The bromine content was found to be 60.73 p. c. and 60.34 p. c. (two samples). The melting point of stearic acid hexabromide is 181° C., and the bromine content is 63.27 p. c. while the tetrabromide derivative has a bromine content of 50.33 p. c. and m. p. of 113–114°.

The ether was recovered from the filtrate and the precipitate dissolved in petroleum ether. The petroleum ether solution was then placed in a refrigerator over night and the deposited crystals filtered off. They were recrystallized five times but the melting point remained at 95° C. The bromine content was found to be 46.25 p. c. and 45.95 p. c., respectively, on two samples.

The petroleum ether was recovered from the filtrate leaving behind a dark liquid. Ten Gm. of this residue were refluxed with 75 Gm. of granulated zinc with 200-cc. alcohol for 5 hours. The alcohol was partially recovered and the residue thrown into about 750 cc. of acidified water. The liberated fatty acids were neutralized with $N/2$ alcoholic KOH. The resultant soap was broken up with hydrochloric acid solution and the fatty acids shaken out with ether. After removal of the ether, a small amount of the residue was tested with 4 cc. of sulphuric acid and one drop of a 1 p. c. vanillin alcoholic solution and gave a violet ring (indication of oleic acid).[2] The I. V. was found to be 78.6 and 79.8 on two samples.

[1] "Chem. Tech. of Oils, Fats and Waxes," 1 (1921), 579.

[2] "Chem. Untersuch. ü. d. Früchte von Cratægus Oxyacantha L.," von L. Baechler, Colmar (1927), 47.

The lead soaps which were insoluble in ether were decomposed with acid in the presence of ether and the fatty acids obtained by removal of the ether. The residue was liquid indicating a very incomplete removal of the unsaturated acids. The fatty acids were taken up in a small amount of alcohol and placed in an ice-salt mixture. A few crystals came out of solution, however, not in sufficient amount to determine the melting point.

Extraction of Fatty Oil with Ether.—Four hundred and forty-six Gm. of seeds supplied by Prof. Richtmann were finely pulverized, sifted and repulverized in an iron mortar. The powder was then placed in a large Soxhlet extractor and exhausted with ether. After recovery of the ether, the extract was found to weigh 132.5 Gm. = 29.7 p. c. S. V. 206.0 and 207.8, respectively. Specific gravity determined with a pycnometer 0.9217 at 25° C. The refractive index (Zeiss) was 1.4840 at 23° C.

The U. S. P. method for the I. V. determination having given unsatisfactory results a larger amount of iodine was used; in the first experiment 40 cc. in place of 25 cc. and in the remaining determinations 50 cc. In this manner concordant results were obtained, *viz.* 207.0, 207.7, 207.4 and 207.3, respectively.

X-RAY CONTRAST MEDIA.*

BY BERNARD FANTUS, M.S., M.D.

The miracle of looking into the interior of the body, of examining and photographing almost each and every one of its major structures has been accomplished by reason of the selective absorption of the Roentgen rays by various tissues of the body; and, where this is insufficient, the introduction of contrast media. These latter are of interest to the pharmacist, as he may be called upon to prepare and supply a number of these.

The great difference in the absorptive power of various materials can best be comprehended by an understanding of the law, that *the absorption of X-rays by media is approximately proportional to the fourth power of the atom number of position of the element in the periodic system.* Table I may serve as a basis for the illustration of the truth of this "law."

TABLE I.—ATOM NUMBERS OF ELEMENTS OF PRACTICAL IMPORTANCE.

Hydrogen	1	Chlorine	17
Carbon	6	Bromine	35
Nitrogen	7	Iodine	53
Oxygen	8	Barium	56
Phosphorus	15	Lead	82
Calcium	20	Bismuth	83

Hence an atom of calcium with its atom number of *20*, absorbs about 40 times more X-rays than an atom of oxygen with its atom number of *8* for:

$20^4 : 8^4 :: 160{,}000 : 4{,}096$, equals approximately *40*.

From this it will be seen that the absorptive power increases enormously as we proceed down the scale.

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* October meeting of Chicago Branch, A. PH. A.

The great difference in absorptive power of various elements in accordance with this proposition may also be visualized by noting (Table II) how many atoms would be required to produce the same degree of absorption as one atom of oxygen.

TABLE II.

1 atom of chlorine equals	20 atoms of oxygen.
1 atom of iodine equals	2,000 atoms of oxygen.
1 atom of barium equals	2,400 atoms of oxygen.
1 atom of bismuth equals	10,000 atoms of oxygen.

The absorptive power of a chemical compound may be calculated by the addition of the atom number of the various elements composing it. Hence most of the tissues of the body, composed as they are of various proportions of the light elements: carbon, oxygen, hydrogen and nitrogen—which do not differ much from each other in atom number—show no difference in absorptive power among each other, or from wood or other organic material. The bones, on the other hand, containing calcium, show a marked difference in absorptive power as compared with the soft parts. Calcium is the natural contrast medium of the body. The artificial contrast media take advantage of the absorptive power of elements of high atom number, such as iodine and barium.

The absoptive power of a body is, of course, not only dependent upon the kind of atoms it is composed of; but also upon the number of atoms per unit space: its density or specific gravity. Hence gas absorbs much less than fluids or solids. Table III gives some idea of the differences in specific gravity:

TABLE III.

Air	0.0013
Fat	0.94
Water	1.0
Soft parts, blood, bile, urine	1.01 to 1.06
Cartilage	1.09
Bone	1.9

From this it will be seen that the difference between the absorptive power of water and the soft tissues is so slight that layers of equal thickness would be practically indistinguishable. The difference between bone and the soft parts is greatly increased by the atomic absorptive power of calcium. The difference between air and the soft parts is enormous: approximately 1000. Hence air or other gas is a good contrast medium.

AIR.

The presence of air in the lungs makes it possible to visualize most of the contents of the chest without the artificial introduction of contrast medium. By reason of the air contained in it, the normal lung is transparent; and, against this background, the heart can be seen with startling distinctness beating away for dear life. Sufficiently advanced diseases of the heart or lung can now be seen, thanks to X-rays, as distinctly as deformities or blemishes on the face. The root structures of the lung—bronchi, large blood vessels and lymph glands—cast somewhat of a shadow because they contain less air; and, when diseased, can be seen much more plainly than when normal, because of the thickening of the tissue. We can see the

diaphragm ascend and descend in respiration by reason of the heavy shadow cast by the liver; and adhesions of the diaphragm can be readily made out by irregularity in its naturally well-rounded dome. As "seeing is believing" the actual demonstration of abnormalities to the eye makes us feel so much more certain about them than the indirect methods of percussion and auscultation we formerly had to rely on.

The air cavities or sinuses in the head stand out so clearly against the denser bone, that it is possible to detect accumulations of pus or filling up by tumors in any of them.

Bold indeed must have been the mind that first conceived the idea of blowing air into the ventricles of the brain, as contrast medium, to make photography of the interior of the living human brain (ventriculography) possible. Though not frequently resorted to, it is at times an important means of localizing brain tumors.

The Roentgen rays have shown us that there is generally a large bubble of gas in the human stomach. People who complain of "having gas on the stomach" merely feel what the rest of us have without feeling, just as people who complain of palpitation merely feel the heart beat, when ordinarily we do not feel this motion. We all know there is gas in the bowel; and by means of it portions of intestine become outlined in normal, X-ray pictures. Particularly extensive accumlation of gas may suggest intestinal disease or obstruction; and this can, at times, be verified by inflation of the bowel with air introduced into it through the rectum. Should rupture of the stomach or bowel occur with escape of gas into the peritoneum, the presence of free gas above the liver may be detected by Roentgen rays when its quantity would not be sufficient for detection by other means. At times oxygen is intentionally introduced into the peritoneum to demonstrate the presence of adhesions and other abnormalities. When this is done properly, the gas is soon absorbed, without untoward results.

Sometimes air is injected into the tissues around a solid organ, for instance the kidney, which may be of considerable help in the diagnosis of kidney tumors.

BARIUM SULPHATE.

At the other extreme of opaqueness stands barium sulphate, which has become so important as a Roentgenographic medium that it is now official in the United States Pharmacopœia. It finds its chief use in the outlining of the shape and location and in the study of the functions of the alimentary tract.

When a person drinks a barium suspension, one can see, by proper posturing before the Roentgen screen, how the gob slides down the gullet with surprising rapidity. Hesitation at any one point means abnormality there. By making the paste thick enough so that it goes down *very* slowly, one can obtain a silhouette of the esophagus which may demonstrate disease in it or its surrounding structures.

To see the intact human stomach working on a meal is a sight our grandfathers dared no more think feasible than flying. It is, nowadays, commonplace in the X-ray laboratory. We can see its size, shape, location, movements and rate of emptying. One can see deep constriction waves pass over it, forcing the contents toward the pylorus and beyond; flicking, at short intervals, a small portion of them into the first part of the duodenum which generally assumes the shape of a little cap, and is therefore spoken of as the "cap of the stomach." Ulcers and cancers and

other abnormalities in these tissues can now at times be recognized with almost the same certainty and clearness with which we can see ulcer or cancer of the skin.

The rate of progress of the meal through the bowel can be followed with scientific precision. By the sixth hour, the meal has normally left the stomach, most of it has passed through the small intestine excepting the last portion of the ileum and has entered the cecum and ascending colon. It is just as surprising how rapidly the meal passes through the small intestine, about 4 or 5 times the length of the body, as it is how slowly it travels through the colon, which is only about as long as the body. Normally within 24 hours most of it, and within 48 hours all of the barium has been eliminated. Abnormally, we find it sticking in the cecum for two or three or more days. This is frequently due to adhesions in the vicinity of the appendix from previous attacks of apppendicitis, or adhesions at the hepatic flexure from gall-bladder or pyloric inflammation. Stagnation here is often associated with spasm of the distal colon, due—no doubt—to the contents in the proximal colon becoming so irritating as to stimulate the distal colon to spasmodic contraction. This establishes a vicious circle in that spasm of the distal colon, increases stagnation in the proximal colon, and the more the contents stagnate the more rotten and irritating they become. To remedy this condition is one of the problems of intestinal housecleaning, we call catharsis. When I was a pharmacist, I thought I knew all about securing operations of the bowel. Now I hesitate to prescribe a cathartic in cases of chronic constipation without a preliminary X-ray examination, because only in this way can I decide with a moderate degree of confidence what remedy to employ. Sometimes there is no delay anywhere excepting in the last part of the large intestine, the rectum; and for this form of constipation enemas are the proper treatment. Even though the bowels move every day, constipation, *i. e.*, retention in the proximal colon, may be present.

The appendix can often be visualized. The place where it is attached to the bowel, the cecum, can always be seen; and the question whether a pain or a tenderness is located in the appendix or elsewhere decided. The appendix should empty itself; when it does not, a "potentially pathologic appendix" is reported.

Barium suspension is also used as an enema; and with it the large bowel can often be filled from beginning to end; and the filling defects from tumors and other abnormalities accurately determined.

The best mode of administration of barium sulphate for stomach and bowel visualization is a strictly pharmaceutical problem. As this heavy substance tends to sediment rapidly, a gum or other colloid is required to keep it in suspension. There is no general agreement, as yet, as to which suspending medium is best. Many roentgenologists administer the barium in buttermilk or in malted milk. Neither of these is ideal from the standpoint of pleasantness. It is poor technic to inflict an unpleasant dose upon a patient, when it might be given in really palatable form. The most pleasant vehicle for the barium, I know of, is a hot cup of cocoa. There seem, however, to be practical difficulties in having this ready at the right temperature at just the right time. So we have experimented with other disguises, and are now giving it sweetened with sugar and flavored with orange; and patients seem to take it without dislike.

An interesting modification of the problem of introducing contrast medium is in connection with fistulas, *i. e.*, abnormal passages leading to some focus of pathology,

the body is attempting to eliminate, but often unable to do so. Injecting fluid or semi-fluid contrast medium may succeed in satisfactorily outlining the tract. More convenient because dispensing with the necessity of a syringe; and often more efficient, because injection is less likely to reach the all important end of the passage, is the introduction of bougies of contrast medium that pharmacists may prepare in accordance with the following formula:

Bismuth Tribromphenate (Xeroform) 5%	1.0
Barium Sulphate	10.0
Cacao Butter	10.0

Make into bougies 8 mm. long and 2 to 3 mm. wide.

One after the other of these little rods is gently and cautiously inserted into the fistula by means of a sterile forceps; the attempt being made to push the previously inserted one further in by means of the next one. This is continued until the melted contrast medium escapes liberally from the fistula opening, which is then sealed with a small wad of cotton and a bit of adhesive plaster.

HALOGEN COMPOUNDS.

Because of their high absorptive power for the X-rays and their relatively low toxicity and irritative action, iodides and bromides, most especially of sodium or potassium, have been used as contrast media, *e. g.*, for showing the interior of the kidney, ureters or bladder. At present, 15 per cent solution of sodium iodide and 25 per cent sodium bromide solution seem to enjoy preference, and give at times remarkable results in clearing up the nature of abdominal or lumbar pain.

A number of halogenated oils, such as lipiodol, iodipin, bromipin, etc., are advantageously used as contrast media for the demonstration of abnormalities in various cavities, passages and tubes of the body. Brominized oils are less liable to give rise to undesirable side effects than iodized oils; but, they do not give as dense a shadow.

Spectacular is the effect of injection of halogenated oil into the trachea, while posturing the patient so that the fluid flows by gravity into that portion of the bronchial tree one desires to explore. It is possible in this way to obtain pictures of lung cavities and of dilated bronchi for the guidance of lung surgery.

Even more heroic is the injection of halogenated oil into the spinal canal. Lipiodol (poppy seed oil containing 54 per cent of iodine) has been used with success in the diagnosis of tumors or obstructions of the spinal canal. Injection of 3 cc. of lipiodol into the upper end of the spinal canal (cisterna magna injection) with the patient in the sitting posture is followed by the prompt fall of the substance to the bottom of the spinal canal. If there is an obstruction in the canal, *e. g.*, by a tumor, the lipiodol will stop at the upper border of the obstruction. By combining lipiodol with olive oil, a so-called light lipiodol is obtained, which, upon injection into the lumbar region of the spinal canal, flows upward. The lower border of the spinal tumor may also be outlined; and surgical removal of it directed most precisely.

Halogenated oil has been injected into the urethra to help in the diagnosing of strictures and other obstructions there. It is also possible to inject it into the seminal vesicles and to obtain pictures of these.

In the diagnosis of sterility in the female, injection of such oil into the uterine cavity and tubes is of great help. One can detect thereby, whether the Fallopian tubes are patent: as, when they are, drops of oil escape into the peritoneal cavity from which they are absorbed without harm.

Oil of this kind has been injected for the purpose of ascertaining the point of obliteration of the blood vessel in thrombosis or embolism. It has also been used for injection into fistulas, wound cavities, and into the accessory sinuses of the nose.

TETIOTHALEIN.

The very acme of romance in achievement is the visualization of the human gall-bladder by means of the Roentgen-rays after introduction into the system of a substance that circulates through the blood, is picked out of it by the bile which thereby becomes opaque to the Roentgen-rays. The reason this is possible is the fact that the bile is a very good solvent for fats and substances soluble in fats. When a body of just the right degree of lipoid solubility gets into the circulation, it is picked out by the liver and eliminated in the bile, no doubt, by a mechanism similar to that which the chemist uses when alkaloids are "shaken out with ether." Of quite a large number of substances that might qualify for this service and have been tried, tetraiodophenolphthalein has been found the best; and the Council on Pharmacy and Chemistry has adopted the abridged name, "tetiothalein" for it, by which it had better be known rather than some of the proprietary names such as "iodeikon."

This is a very feeble acid insoluble in water which like other phenolphthaleins becomes soluble in alkali with which this compound strikes a beautiful purple color. The administration of the free acid in its ordinary form has merely a cathartic action analogous to that of phenolphthalein. When it is dissolved in alkali, it is so strongly irritating by reason of free alkali as to cause vomiting. It is for this reason that Graham who deserves most credit for the development of this method has resorted to intravenous administration of the dye for the purpose of securing gall-bladder visualization. As the intravenous injection is not only somewhat troublesome, but also very liable to cause undesirable and sometimes alarming side effects, a good deal of experimentation has been undertaken to make its oral administration possible. Enteric coating was the first attempt in this direction. Unfortunately absolutely dependable enteric coating has not yet been devised. Sometimes some of these capsules do not dissolve in the intestines and at other times open up in the stomach and are rejected by vomiting. In either case, the purpose of the administration is defeated, no gall-bladder shadow being obtained. It was at this stage that I undertook experiments with the view of freeing the dye from its irritant qualities which I believed and now know to be due to the alkali required to keep it in solution. I reasoned that a preparation of the substance in the form of a colloid which is the next thing to a solution might at one and the same time give us a non-irritating and still readily absorbable administration form. By precipitating a dilute solution of the dye with a very feeble acid, such as carbonic acid, such colloid precipitate can be obtained and I found that it met the requirements very well. The result of my studies at this stage were published in the *Journal of the American Medical Association* of July 16, 1927, where a formula for the preparation of the colloidal tetiothalein may be found. Unfortunately this preparation was unstable

and I have since then experimented upon ways and means of securing a more stable preparation, and I was efficiently helped in this endeavor by the Abbot Laboratories. We have finally succeeded in reducing the bulk of the dose to the size of a two-ounce bottle and in giving it sufficient stability for practical purposes.

In the course of our experiments we tried a powder form of such composition that the tetiothalein was precipitated upon admixture with water. We found that, under these circumstances, the precipitate was not sufficiently colloidal to secure satisfactory absorbability and good gall-bladder shadow. Nevertheless, since the publication of my experiments on this substance, two powder preparations appeared upon the market, both of which make use of extemporaneous precipitation, which, unfortunately is hardly more than 50 per cent efficient. It may be of interest in this connection to state that we had an opportunity to experiment with mechanically produced colloidal tetiothalein and that this proved practically unabsorbable.

When tetiothalein is injected intravenously or has been successfully administered by mouth and the subject fasts, in course of hours the gall-bladder becomes filled with bile that casts a denser and denser shadow—the density increasing due to absorption of water from the bile and consequent thickening of it. In this manner pictures of the gall-bladder can be obtained by means of the X-rays and not only the size, shape and position of the gall-bladder determined or the presence or absence of gall-stones ascertained, but also its functional quality studied. For, when a meal rich in fat is taken, the shadow disappears normally more or less completely in two hours. Persistence of the shadow, therefore, much beyond this period means abnormality of the function of the gall-bladder.

From all this it will be seen that Roentgenography, the infant among the diagnostic medical procedures, is bidding fair to outstrip all others; and that artificial contrast media have increased its extent of applicability to an almost unbelievable degree.

METHOD FOR TESTING ANTISEPTIC DYES.

BY GEORGE F. REDDISH, PH.D.

In a previous publication, the writer (1) outlined laboratory methods for determining the efficiency of various kinds of antiseptic preparations. The methods described constituted an attempt to simulate to some degree at least the conditions met with in practice. It is, of course, impossible to duplicate practical conditions closely, but these methods do constitute a distinct attempt to approximate practical use as nearly as reasonably possible and consistent with laboratory practice. In devising these tests, the use for which the various antiseptic preparations are intended, the character of the preparation and the method of application were deciding factors in determining the laboratory procedure for each. All that is required of an antiseptic is that it render the pathogenic microörganisms innocuous when it is applied to infected tissue surfaces.

In the paper referred to above (1), page 495, the writer made the following statement:

"There are types of antiseptic preparations and methods of application by means of which infective organisms are merely held in check and not actually killed by the chemical agent used.

The use of wet dressings, irrigations, such as the hypochlorite method of treating war wounds advocated by Carrel and Dakin, the use of bacteriostatic dyes, the proper application of antiseptic ointments and salves, etc., will, when properly applied, be effective in preventing the activity of microörganisms and leave them easy prey to the leucocytes. Such preparations must be tested in a different manner from that used for the ordinary liquid antiseptics."

Referring particularly to antiseptic dye substances, it is evident that the method of laboratory testing would differ very considerably from procedures recommended for antiseptics which remain on infected surfaces but a short time. Since dye substances do remain in contact with the tissues to which they are applied for an indefinite time, they can be considered in the nature of a wet dressing. It is, in fact, a modified wet dressing to this extent that the antiseptic remains fixed in the treated area for an indefinite time and accomplishes a germicidal and bacteriostatic action as well. Since these antiseptic dyes do remain in the site of application for an indefinite time, the laboratory test indicated is one that will simulate this condition as closely as possible.

On page 532 in the above paper, the following statement is made:

"In examining antiseptic dyes, a more complicated situation presents itself. When these dyes are applied to infected surfaces or wounds they penetrate the tissues and are expected to continue their action long after they have been applied. Since it is difficult to be assured of this continued action in all kinds of antiseptic dyes, and since in regulatory work it is not possible to make a complicated, detailed study of each one, for the present it seems consistent to use a test showing actual killing power. For this purpose the filter paper test is applicable."

The method suggested at that time is evidently not indicated for this type of antiseptic preparation and, as a matter of fact, was never used by the writer in the regulation and control of antiseptic dyes. It was suggested against the better judgment of the writer for the simple reason that no applicable method was then at hand, and because no immediate need for control of this type of preparation was felt at that time.

In the meantime, a method has come to the writer's attention which is more nearly applicable for the testing of antiseptic dyes than any so far devised. This procedure was developed in the Pease Laboratories, New York City, by Dr. L. C. Himebaugh (2), but has not as yet been published by him. This method has been used by the writer during the past two years with very satisfactory results. After very careful study of this test, the writer is convinced that this method simulates to a marked degree the conditions under which these dyes exert their antiseptic effect when used in practice.

This method has been tentatively designated by Dr. Himebaugh as the "Cup Plate Method" and is being described here with his permission. While some slight modifications have been introduced by the writer, they are changes which do not alter in any way the general principles of the test nor the results to be obtained. The test is, briefly, as follows:

Staphylococcus aureus of normal resistance (3), (4) is grown at 37° C. in broth (0.5% Liebig's beef extract, 1.0% Armour's peptone, 0.5% sodium chloride in distilled water, adjusted to p_H 6.6 to 6.8) and transferred for three consecutive days. One-tenth of a cc. of a 1–100 dilution of this culture is added to 15 cc. of melted serum-agar (10% blood serum in nutrient agar containing 1.5% agar)

cooled to 45° C., the culture thoroughly mixed in the serum-agar and poured into a Petri dish. A sterile glass stopper or vial 1.5 cm. in diameter is immediately placed in the center of the dish and left until the agar has cooled. As soon as the agar has hardened sufficiently, the glass stopper or vial is removed by twisting slightly and the small cracks and crevices caused by removal of the glass stopper are sealed with two or three drops of sterile agar. Enough of the antiseptic dye solution to almost fill the cup-like depression (0.25 cc.) is placed into the cup and the plate incubated at 37° C. covered with an unglazed clay top. These plates are observed at the end of 24, 48 and 72 hours. If the dye substance is antiseptic and if it penetrates the serum-agar medium in germicidal or bacteriostatic strength there will be a clear zone around the cup. (See Fig. 1.) Subcultures into broth from different parts of the zone are necessary to determine whether the clear zone represents germicidal or bacteriostatic action. However, a clear zone around the cup is all that is necessary to show antiseptic power of the dye substance being tested. If *any* antiseptic solution will penetrate serum-agar of the above composition and after doing so either kill or inhibit the growth of the test organism, *Staphylococcus aureus*, and if the antiseptic when used in practice remains in or on the site of application for a long time, it is reasonable to assume that it will render the infective microörganisms innocuous.

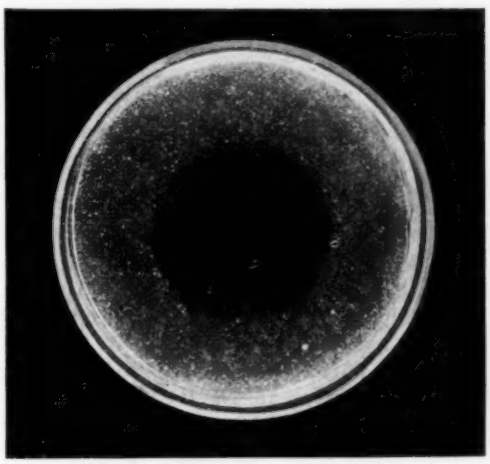

Fig. 1.—This illustrates the penetration and antiseptic action of 2% aqueous mercurochrome in a serum-agar plate containing *Staphylococcus aureus*. This antiseptic dye penetrates the medium for a distance of 1 cm. from the edge of the cup.

The relation between the penetration of a specific antiseptic substance through nutrient agar and the absorption of this same antiseptic through the skin has been well demonstrated by Zeigler (5). He used iodine ointment (U. S. P.) and stainless iodine ointment (N. F.) and tested them for antiseptic action by the method which I described in a previous publication (1). (In these tests plain nutrient agar without serum was used instead of serum-agar.) He then studied the absorption power of both these ointments through the skin by the method described by Witzel and Sollman (6). Iodine ointment (U.S.P.) gives a wide clear zone by the agar plate test and the iodine from this ointment readily penetrates into and through the skin. On the other hand, stainless iodine ointment (N. F.) does not give a clear zone on the agar plate and when tested for absorption the iodine is *not* absorbed through the skin. Because of this very definite correlation between penetration of iodine through nutrient agar and absorption through the skin, it is consistent to interpret this laboratory test in terms of antiseptic efficiency when such preparations are used in practice. The same interpretation is made of the agar cup-plate test. When the antiseptic dye penetrates the agar medium (in this case serum-agar) and forms a clear zone around the cup, it is reasonable to expect that

it will also penetrate the skin and body tissues and exert its antiseptic action there in a similar manner. Of course the absorption of different chemical substances through the skin will vary considerably, but antiseptic dyes are well known for their ability to penetrate the skin and body tissues. Therefore, the penetration of antiseptic dyes through serum-agar to give a clear zone around the cup is a safe index of the antiseptic action that can be expected of these dyes when used in practice.

SUMMARY.

A method for testing antiseptic dye solutions is described. This method is the one recommended by Himebaugh of the Pease Laboratories, New York City, in 1927, for determining the penetrating power and antiseptic action of antiseptic solutions in general. The method is eminently suited for testing the antiseptic action of dye substances, and is the only applicable test which has so far come to the writer's attention. It is recommended that this method be used as a standard procedure for testing antiseptic dye substances.

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FRENCH TECHNICAL SCHOOL OF APPRENTICESHIP FOR THE DRUG, PERFUMERY AND RAW PRODUCTS TRADE.

The lectures on crude organized by the Wholesale Druggists' Association, of Paris, for the benefit of their employees are to be transformed to a "Technical School of Apprenticeship for the Drug, Perfumery and Raw Products Trade." This action has been taken in view of the new apprenticeship tax, of which the proceeds are to be devoted to technical education. The Association has demanded that their trade be placed on the same footing (as regards the tax) as the perfumers, and it has been arranged that 70 per cent reduction shall be accorded for professional education and formation of skilled and half-skilled labor, 20 per cent for formation of staffs and laboratories and 10 per cent for household instruction. The Minister of Public Instruction allocates an annual sum of 2500 fr. to the school.—Through *Chemist and Druggist*, of January 26th.

CHEMICAL NATURE OF PEPSIN.

Pepsin is difficult to investigate chemically because its aqueous solutions are rapidly inactivated by dilution and agitation, and partially also by aeration. The addition of alcohol or acetone in presence of mineral acids converts pepsin into an insoluble compound from which the enzyme cannot be regenerated. In presence of picric acid or its salts, pepsin becomes more stable. It can be precipitated quantitatively from concentrated solutions, but it is uncertain whether the precipitate is a true compound or merely an adsorption combination. The fact that some precipitates have greater stability and that some reagents render pepsin totally inactive is held to be evidence that true compounds are formed. The solubility of the sodium and barium compounds of pepsin may indicate that salts are formed with the acid groups in the pepsin molecule—the digestive milk coagulating power. There is also evidence that pepsin consists of an inactive fraction and a kinase.—Through *Chem. Abstr.*

ON THE ESTIMATION OF ALKALOIDS IN ADMIXTURE WITH VEGETABLE DRUGS.*

BY GEORGE E. ÉWE.

Watkins and Palkin found[1] that calcium and magnesium-fatty acid soaps when present in alkaloid-bearing materials increase the apparent alkaloidal content when assay is attempted by direct "shake-out" methods, owing to the fact that these soaps are soluble in chloroform and the basic radicle is included with the alkaloid and enters into the titration. They also found that this does not occur with the ammonium, sodium and potassium-soaps of fatty acids. In this laboratory it has often been noted that erroneous results will be obtained in alkaloidal assays of products containing vegetable drugs when an attempt is made to determine the alkaloid by merely dissolving the product in a little water, adding ammonia, extracting the chloroform, evaporating the chloroform to a few cc. in volume, adding a measured excess of standard sulphuric acid, boiling off the chloroform, adding methyl red indicator and titrating back the excess of acid with $N/50$ Sodium Hydroxide.

The following results illustrate the basic effect of ammoniacal, chloroformic extractives of a few different vegetable drugs. Separate portions of powdered rhubarb, gentian, podophyllin, capsicum, cannabis, tannic acid and powdered extract of jalap were shaken occasionally with a mixture of chloroform and ammonia water during 24 hours and the ammoniacal, chloroformic layers then filtered off clearly. Aliquots of these extracts were evaporated to 3 cc., a measured excess of standard sulphuric acid was added, the chloroform was evaporated entirely and the excess of acid titrated back with $N/50$ Sodium Hydroxide, using methyl red indicator. In each case with the exception of the rhubarb and tannic acid, some acid was neutralized and consequently this would have the effect of increasing the apparent proportion of alkaloid if these extractives were in admixture with an alkaloidal residue during titration. The extractives from the rhubarb and tannic acid titrated as though a trifle acid in reaction although the apparent acidity was never equivalent to more than 0.2 cc. $N/50$ Sodium Hydroxide which is within the limits of experimental error, so that it is likely that ammoniacal, chloroformic extractives of rhubarb and tannic acid exert no measurable basic effect. For purposes of comparison with later figures the basic effects yielded by the several extractives are recorded in terms of grams of strychnine alkaloid in the following table.

TABLE I.

Drug.	Blank.	Gentian.	Podophyllum.	Capsicum.	Cannabis.	P. E. Jalap.
Amount of drug		0.66	0.33	See note	0.66	0.33
Basic effect	None	0.00675	0.00735	0.0235	0.0131	0.00388

NOTE: No record was kept of the amount of capsicum used; the ammoniacal, chloroformic extract having a light amber color.

Watkins and Palkin[1] also found that the disturbing influence of these "earthy" soaps could be eliminated by extracting an acidified solution of the impure alkaloids with chloroform to remove the fatty acids and then liberating the alkaloids with

* Scientific Section, A. PH. A., Portland meeting, 1928.

[1] *J. A. O. A. C.*, Vol. X, 1 (1927), 130–135.

ammonia, extracting with chloroform, evaporating and titrating as usual. In this laboratory the experience of the above mentioned authors has been essentially duplicated; it is our custom to evaporate the chloroformic solution of crude alkaloids in a flask to about 3 cc.; add 10 cc. of 2% sulphuric acid, shake and transfer the contents of the flask to a separator, draw off the chloroformic layer and wash it with 5 cc. of 2% sulphuric acid, return the acid washings to the main bulk of acidified alkaloidal solution and reject the chloroform, wash the flask in which the evaporation was carried out repeatedly with small portions of 2% sulphuric acid and chloroform as before until all the alkaloid has been transferred to the separator; wash the combined acidified alkaloidal solution repeatedly with small portions of chloroform until all chloroform soluble matter is extracted (usually indicated by absence of color in the chloroformic layer), washing the chloroform extractions in turn with small portions of 2% sulphuric acid and returning the acid extractions to the main bulk of acidified alkaloidal solution while rejecting the chloroformic layer; then liberate the alkaloids with ammonia, extract with chloroform, evaporate the chloroformic extracts in a flask to about 3 cc., add excess of standard sulphuric acid, boil off the chloroform entirely, add methyl-red indicator and titrate back with $N/50$ Sodium Hydroxide. This method, in general, has proven very successful in the assay of such complex combinations as tablets containing $^1/_{120}$ grain of alkaloidal salt each, along with various oily and resinous vegetable drugs, such as gentian, mandrake, capsicum, cactus, cannabis, etc.; although slight modifications are necessary in its application to specific cases. The usefulness of this method in eliminating the disturbing factors introduced by the presence of ammoniacal, chloroformic extractive of the several vegetable drugs is illustrated by the following experiments and results: 10-cc. portions of a standardized solution of strychnine alkaloid in chloroform were added to aliquot portions of ammoniacal, chloroformic extracts of several of the drugs mentioned above, the mixture was then evaporated to about 5 cc. and the alkaloid purified, recovered and titrated according to the general method outlined in the preceding paragraphs, the following results being obtained.

TABLE II.

Drug.	Gentian.	Podophyllum.	Capsicum.	Cannabis.	P. E. Jalap.
Amount of drug	0.66	0.33	See note	0.66	0.33
Strych. alkaloid added	0.0624	0.0624	0.0624	0.0624	0.0624
Strych. alkaloid recovered	0.0634	0.0612	0.0612	0.0622	0.0622

NOTE: No record was kept of the amount of capsicum used, the ammonical, chloroformic extract having a light amber color.

The standardized solution of strychnine alkaloid in chloroform was standardized by two methods and the average of several trials by the two methods was taken as standard. One method consisted of evaporating 10 cc. of the solution in a flask to 3 cc. adding excess of standard sulphuric acid, boiling off the chloroform entirely and titrating back with $N/50$ Sodium Hydroxide, using methyl-red indicator. The second method was similar to the first with the exception that 10 cc. of chloroform saturated with ammonia water was added to the 10-cc. aliquot of the standardized strychnine solution before evaporation in order to more closely simulate the method of titrating the alkaloids recovered in the foregoing experiments. Both methods gave almost exactly similar results; repeated trials by the first method ranging

between 0.0620 and 0.0626 Gm. strychnine alkaloid per 10 cc., and by the second method 0.0622 and 0.0626 Gm.; the average of all trials being 0.0624 Gm.

In order to ascertain something of the nature of the basic substance which increased the apparent alkaloidal content in the foregoing experiments, 10-cc. portions of the standardized strychnine alkaloid solution were added to aliquots of ammoniacal, chloroformic extracts of several vegetable drugs of known apparent alkaloidal basicity and the total basicity then determined by the methods used to standardize the strychnine solution. Since the basic substance was thus subjected to the action of the strychnine alkaloid at elevated temperature a total basicity lower than the sum of the basicities of the strychnine alkaloid and apparent alkaloidal basicity of the drugs combined in the terms of strychnine alkaloid was to be expected if the basic substance was the ammonium radicle since strychnine alkaloid readily liberates ammonia from even such "strong" acids as hydrochloric acid under these conditions. The basic substance encountered in these experiments was not ammonia since the total basicity in terms of strychnine alkaloid checked up closely with the calculated total as shown by the following table.

TABLE III.

Drug.	Gentian.	Podophyllum.	Capsicum.	Cannabis.	P. E. Jalap.
Amount of drug	0.66	0.33	See note	0.66	0.33
Apparent basicity of drug (in terms of strychnine alkaloid)	0.00675	0.00735	0.0235	0.0131	0.00388
Strychnine alkaloid added	0.0624	0.0624	0.0624	.0624	0.0624
Total basicity expected (in terms of strychnine alkaloid)	0.0692	0.0698	0.0859	0.0755	0.0663
Total basicity found (in terms of strychnine alkaloid)	0.0698	0.0709	0.0844	0.0773	0.0674

NOTE: No record was kept of the amount of capsicum used, the ammoniacal, chloroformic extract possessing a light amber color.

While it seems certain that the ammonium radicle was not the interfering basic substance encountered in these experiments, the exact nature of the basic substance was not determined. It is possible that these interfering substances are "earthy" bases analogous to the calcium and magnesium soaps which were found by Watkins and Palkin[1] to exert a similar influence in alkaloidal assay processes; however, consideration must be given to the fact that most of the drugs in the present study are resinous in nature and may exert an action differing from the materials worked with by Watkins and Palkin.

SUMMARY.

While it is known[1] that basic substances other than alkaloids may be included with the alkaloidal residue separated during analysis when "fatty" acids or "soaps" of "earthy" bases are present, unless proper procedure is resorted to to overcome the influence of these interfering substances, in the present study it is shown that the influence of "resinous" and other types of constituents of vegetable drugs also must be guarded against in estimating alkaloids in admixture with these drugs. Means of overcoming the influence of these interfering substances are outlined and it is incidentally pointed out that these methods are applicable to the estimation of small proportions of alkaloids in complex admixture with vegetable drugs.

TAILBY NASON COMPANY,
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A PHARMACOGNOSTIC STUDY OF CH'AN SU, THE DRIED VENOM OF THE CHINESE TOAD.*[1]

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I. HISTORICAL INTRODUCTION.

For centuries the toad has been known in the Western World to produce a poisonous secretion. Comprehensive historical accounts are given in the works of Faust (2), (3), (4), Abel and Macht (5) and Lewin (6), (7), upon which the following statements are based. The secretion of the toad or its internal organs was a favorite ingredient of poisoning mixtures used for criminal purposes in ancient times. Juvenal, the poet, for example, described the skill of Roman women in murdering their husbands with various agents, one of which was toads' lungs. In the beginning of the fourteenth century, Bishop Guichard of Troyes was accused of poisoning the wife of Philippe le Bel with a preparation of scorpions, toads and spiders. During the sixteenth century, processes of extracting the toads' poison with salt were devised by murderers, especially the Italian poisoners. It was stated that the victims who took the salt succumbed quickly. In the same period a subtle method of inflicting wounds on the enemy's body without injuring the part was to rub his skin with the toads' secretion. In warfare and in the pursuit of game the toad secretion has long been used as an arrow poison by some Indian tribes (cited by Abel and Macht). In the beginning of the eighteenth century, toad poison was added to explosive shells. It was probably assumed that the enemy's death would be doubly assured if explosives were reënforced with poisons. In dispensatories and medical treatises, toad or toad poison is mentioned and described as a therapeutic agent. Paré (1510–1590), for example, dedicated the thirty-first chapter of his famous book to toad poison (Faust). In this connection he described two cases of toad poisoning and cited a third.

Powdered toad is highly recommended for dropsy, epistaxis and other ailments in the "Thesaurus Pharmakologicus" of J. Schröder, published in Leyden in 1672, and in the "Pharmacologia" of S. Dale, published in London in 1672 (quoted by Abel and Macht). At one time it was believed that the toad derived its poison from the earth and poisonous leaves, especially the mushrooms—thus the origin of the English expression "Toad stool," and the Dutch term "Padden Stollen," for mushrooms.

The nineteenth century marked the beginning of actual scientific investigations of the toad poison. Thus the secretion has been definitely localized in the skin glands of the back and sides, and the "parotid glands" behind the ears (8), (9), (10), (11), (12), (13). Vulpian (14), (15) was the first to make accurate observations on the action of the poison on the heart together with the toxic syndrome, and to show that the toad is tolerant to its own poison. His results were confirmed by Fornara (16). Vulpian, Fornara and later workers (17), (18), (19) found that the toad is

* This investigation has been made with the assistance of a grant from the Committee on Therapeutic Research, Council on Pharmacy and Chemistry, American Medical Association.

[1] A preliminary report of this work was made to the Society for Experimental Biology and Medicine (1).

comparatively resistant to digitalis bodies. Recent studies appear to indicate that certain ions such as Ca^{++} and K^{+} may play an important part in the establishment of the tolerance (20), (21), (22).

The chemical investigation of the toad poison was begun by Pelletier (23), and followed by Gratiolet and Cloëz (24), Fornara (16), Calmels (25), Phisalix and Bertrand (26), Bertrand (27) and Faust (2). The highly potent principles prepared by Phisalix and Bertrand, and Faust, were still amorphous in nature. Abel in association with Macht (5) was the first to isolate bufagin and epinephrine in crystalline form from the American tropical toad, *Bufa agua*. Wieland and Alles later succeeded in obtaining crystalline bufotalin and bufotoxin from the European common toad, *Bufo vulgaris* (28). Handovsky (29) separated from the same species an alkaloid which, he thinks, is a pyrrole derivative and distinctly different from epinephrine. Novaro (30) claimed to have found epinephrine in *Bufo marinus*, but did not obtain it in crystalline form.

Fig. 1.—The Chinese toad as illustrated in Pentsao Kang Mu.

In China, as in the Occident, the toad and its dried venom have been known for many years and are admitted to the materia medica. The dried venom is called Ch'an Su in Mandarin, Ch'an meaning the toad and Su the venom (31). According to Pentsao Kang Mu (32) the preparation can be employed by external application in the treatment of canker sores, sinusitis, and many local inflammatory conditions, in the relief of toothache, and in the arrest of hemorrhages from the gums. When administered internally in the form of a compound pill, it is said to be able to break colds. Special emphasis is placed on the toxic nature of the toad and its venom. It is stated that dogs biting toads have their mouths swollen. If the fresh venom comes into contact with man's conjunctiva, it produces congestion and blurring of vision.

Ch'an Su has been the subject of study under the name of "Senso" by several Japanese workers during the last few years. Hayashi (33) reported that it was 50 to 100 times more powerful than digitalis. Shimizu (34) separated cholesterol, and bufagin $C_{18}H_{24}O_4$, m. p. 209–210° C., which he claimed to be identical with Abel's bufagin. The same author separated an amorphous substance which he termed bufotoxin. Kodama (35), (36) gave the formula for bufagin as $C_{27}H_{34}O_7$, m. p. 222–223° C. and claims to have succeeded in separating bufotoxin in a crystalline form, $C_8H_{10}O_2$, m. p. 203–204° C.; while Kotake (37) on repeating his work found the formula for bufagin to be $C_{29}H_{38}O_7$, m. p. 220–221° C., and Kodama's bufotoxin to be a chlorine-containing compound, $C_{27}H_{35}O_5Cl$. Both Shimizu and Kodama maintained that bufotoxin had a picrotoxin action.

During 1923–25, one of us (Chen) made a preliminary study of several Chinese drugs in China. Ch'an Su was one of them. Owing to the extensive work on

ephedrine, a thorough investigation was delayed until in 1928. Jensen was then invited to undertake the separation and establish the nature of the active principles.

II. THE IDENTITY OF THE TOAD.

A picture of the toad as illustrated in Pentsao Kang Mu is reproduced in Fig. 1. At present we are not certain as to which species produces the poisonous venom, although attempts have been made to secure specimens of the toad for a detailed morphological study. Nieden (38) in his monograph on Amphibia included 145 species in the genus *Bufo* distributed in Europe, Asia, Africa and America. Of this number, 7 occur in China, as shown below:

Species.	Habitat.	Species.	Habitat.
Bufo vulgaris	North of Himalaya Mountains	*B. mammatus*	Szechuan Province
B. raddei	Tibet	*B. melanostictus*	Southern China
B. viridis	Mongolia	*B. himalayanus*	Himalaya regions
B. nouettei	Nanchang		

Recently, a new species was found in Mongolia (39).

The Pentsao Kang Mu (32), which was written over three centuries ago, gives a simple description of the toad. It attains a considerable size and lives in the marshes and other damp areas of the river and lake regions of China. It has a protuberant abdomen, wrinkles and warts on the back and poisonous secretions in the skin. It is slow in its movements, unable to jump and does not sing. These general statements are, of course, not sufficient for zoölogical diagnosis.

Fig. 2.—Illustrating a disc of Ch'an Su, the dried toad venom.

According to two modern Chinese biological dictionaries, the Chinese toad is identified as *Bufo vulgaris* in one (40), but *B. bufo japonicus* in the other (41). Either identification is open to question, from a chemical point of view. At present there has not been any report that all the toads yield the same active principles in their skin secretions. One is led to assume, from the published data, that each species produces its own characteristic secretion, although at least one constituent of each secretion has the typical action on the heart. It is therefore doubtful that the Chinese toad is identical with *B. vulgaris*, for epinephrine, which is present in Ch'an Su as will be seen below, has never been demonstrated in the European common toad. The toad giving rise to Ch'an Su is also less likely to be *B. bufo japonicus* because Kotake (42) isolated from the latter gamabufotalin, $C_{27}H_{38}O_6$, m. p. 261–263° C., which is not identical with the bufagin separated from Ch'an Su. Nieden (38) classified *B. bufo japonicus* as a variety of *B. vulgaris*. Further study is necessary to decide the correct species of this toad.

III. GENERAL CHARACTERISTICS OF CH'AN SU, THE DRIED VENOM.

The material for the present investigation, three catties in quantity, was purchased from Tung Jen T'ang, Peiping, one of the oldest drug stores in China (43). The dried poison comes in round, smooth and dark brown discs, as illustrated in Fig. 2. They are hard and thinner toward the margins. There is a hole in the center of each disc through which a string is passed. Obviously, they are hung up and air-dried. They vary in size, thickness and weight, as shown in Table I. Their diameter ranges from 6.95 to 8.80 cm., their thickness from 1.45 to 2.15 cm., and their individual weight from 47.03 to 109.34 Gm. The total number of discs in our supply was 21, and total weight 1729.30 Gm.

TABLE I.—SHOWING THE DIAMETER, THICKNESS, AND WEIGHT OF THE DISCS OF CH'AN SU.

Disc no.	Greatest diameter in cm.	Greatest thickness in cm.	Weight in Gm.	Remarks.
1	6.95	1.45	47.03	Broken
2	7.90	2.10	101.25	
3	7.90	1.65	75.21	
4	8.80	1.90	106.52	
5	7.70	2.05	83.49	
6	7.40	1.85	74.63	
7	8.30	1.80	85.71	
8	7.80	1.70	79.80	
9	7.80	1.95	83.12	
10	7.90	1.50	72.81	
11	7.85	2.00	86.75	
12	8.55	2.05	109.34	
13	8.10	1.75	89.42	
14	7.50	1.70	65.25	
15	7.25	1.45	61.68	
16	8.15	2.15	98.33	
17	8.40	2.05	106.39	
18	8.35	1.80	90.06	
19	7.85	2.00	83.22	
20	7.00	1.60	47.96	Broken and incomplete
21	8.10	1.65	81.33	Broken and incomplete
		Total	1729.30	

At present no knowledge has as yet been obtained as to exactly how these discs are made by the druggists. According to Pentsao Kang Mu (32), the secretion, white in color, may be collected on oil paper by squeezing the head of the toad between and behind the eyes (probably from the parotid glands). Another method is to administer garlic and paper into the toad's mouth, and later scrape off the secretion from the body with bamboo sticks (probably from the whole skin glands). Inquiry is being made as to whether or not these methods are still employed to-day.

The discs of Ch'an Su are very difficult to break. The broken surfaces are smooth and the color may be lighter in the center. When ground in a mortar or in a machine, one notices, if unprotected, a tickling of the nose, followed by continuous sneezing. The tip of the tongue becomes anæsthetized, and the throat is first dry for a very brief period, succeeded by an increase in secretion. There is no irritation of the eyes. These effects may last for over half an hour depending on the amount

inhaled. Sneezing and numbness of the tongue were previously experienced by Shimizu (34).

A microscopic examination of a No. 60 powder, which is brown to the naked eye, shows that it consists of particles, angular and irregular in shape, greenish black in color, somewhat translucent, with clearly defined edges. When a drop of water is added to the powder, the particles at once swell up and assume a granular appearance with indistinct margins. Disintegration does not take place unless the mass is disturbed mechanically. No definite cellular elements can be found when stained with methylene blue, or Wilson's reagent. The original contours of the particles are preserved if ether or chloroform is dropped on the powder under the microscope.

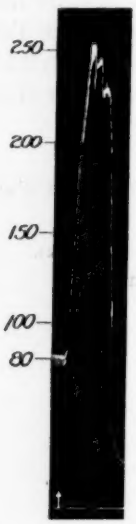

Fig. 3.—Showing the physiological effects of an alcoholic extract of Ch'an Su.

Cat, male, dark brown, 2.7 Kg., decerebrated and pithed, artificial respiration at the rate of 24 per minute. At signal, 0.5 cc. of an alcoholic extract (100 cc. of 80 per cent alcohol to each gram of Ch'an Su on water for an hour), was injected intravenously. The blood pressure rose from 80 to 258 mm. Hg, soon followed by a permanent fall and death of the animal. The ventricles were found fibrillating when the chest was opened.

In a test-tube one can see the particles swell if water is brought into contact with the powder, which now assumes a whitish appearance. When the powder is ground with a quantity of water (100 cc. for each Gm. of the powder), a fine emulsion is obtained. Filtration is practically impossible, and the coarse particles can be removed only by means of a strainer. The emulsion thus obtained is slightly acid in reaction, gives a positive biuret test, and a red color with Lugol's solution. It has a marked pressor action in anæsthetized dogs or pithed cats, when injected intravenously in small quantities (0.5 cc.). A cold acetic acid extract also raises the blood pressure in experimental animals. An alcoholic extract, made on a water-bath with 100 cc. of 80 per cent alcohol to each Gm. of powder, yields a clear solution, brown in color. It gives a positive catechol reaction with ferric chloride, and is very toxic to animals. A quantity of 0.5 cc. caused a marked rise of blood pressure but was soon followed by the death of the animal as shown in Fig. 3. The net rise of blood pressure in that experiment was 178 mm. Hg. After the blood pressure fell to the fatal level, the ventricles were found in fibrillation when the chest was opened. This powerful response of the animal is due to the component action of epinephrine, bufagin and a *N*-containing compound as will be seen below.

IV. ACTIVE CONSTITUENTS OF CH'AN SU.

So far four principles have been successfully isolated in crystalline form. They are as follows:

1. *Cholesterol*, m. p. 146° C., shows an ergosterol content of two parts per thousand, when examined spectroscopically.

2. *Bufagin*, m. p. 217° C., is toxic to frogs' and cats' hearts.

3. *A N-Containing Compound*, m. p. 200° C., is more toxic than bufagin.
4. *Epinephrine*, m. p. 212° C.

We are the first to have succeeded in obtaining epinephrine and the N-containing compound from Ch'an Su in crystalline form. Detailed accounts of the chemical and pharmacological studies will appear elsewhere.

V. DETERMINATION OF MOISTURE, VOLATILE SUBSTANCES, AND ASH CONTENTS OF CH'AN SU.

Samples of 0.5 Gm. of the powdered material were taken and studied in the same manner as in the investigation of Ma Huang published previously by one of us in THIS JOURNAL (44). The following results were obtained:

		Average.
Moisture in p. c.	5.10 4.98 5.04	5.04
Volatile substances in p. c.	1.08 1.06 1.12	1.09
Ash in p. c.	2.94 3.16 3.20	3.10

The ashing of the powder deserves comment. During ignition, a peculiar empyreumatic odor, somewhat sweet, somewhat pungent, is evolved. The powder becomes dark brown and then black, melts and rises. If care is not taken, it may easily run over the crucible. Because of this fact, each sample is best ignited in the air, and later incinerated in an electric muffle furnace. During the early stage, the inner walls of the crucible are covered with carbon particles. As combustion proceeds the charred material gradually sinks to the bottom until finally the ash assumes a grayish white color.

VI. ANALYSIS OF ASH.

The water soluble, acid soluble (in 10 per cent HCl), and insoluble portions of each ash were determined. The common elements were tested for with a larger incinerated sample. Iron and phosphorus are present in a considerable quantity. The results are shown below:

Analysis for		Average.		
	10.20		Chlorine	Trace
H_2O soluble in p. c.	11.39	11.33	Sulphur	Trace
	12.41		Phosphorus	Present
	38.10		Iron	Present
HCl soluble in p. c.	37.34	37.23	Potassium	Present
	36.25		Sodium	Present
	51.70		Manganese	Present
Insoluble in p. c.	51.27	51.44	Calcium	Absent
	51.35			

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PYORRHEA.

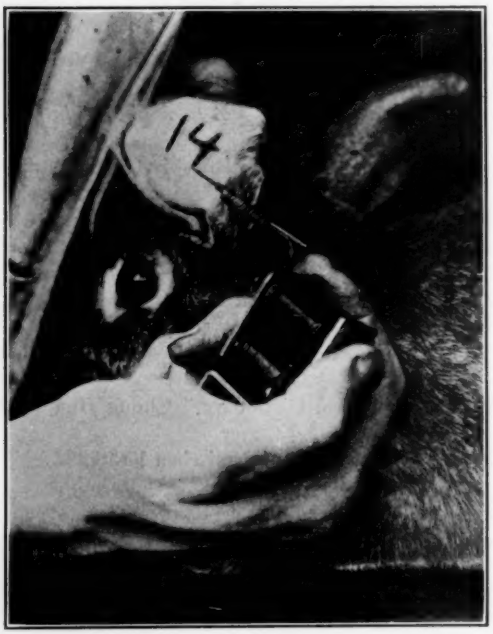
Bacteriologic study of pyrorrhea alveolaris. T. J. Cook and E. C. Stafne.—*Dental Cosmos*, 61 (1929), 115.—Through *Squibb Abstract Bulletin*, Feb. 13, 1929.

The present study was undertaken for the purpose of throwing further light on the relationship of pyorrhea alveolaris to metastatic infection. Streptococci were isolated from pyorrhea pockets and inoculated into animals to determine their virulence and selective affinity. Pathologic lesions resembling those of arthritis were found in 30% of the rabbits that were injected intravenously with the streptococci from the pyorrhea pockets of patients suffering from arthritis; in those injected with cultures obtained from patients suffering from ulcerative colitis; similar results were obtained in the case of ulcers of the stomach and duodenum, nephritis, cholecystitis, etc., in each case streptococci from the pyorrhea pockets of such patients producing similar pathologic conditions in a certain percentage of the animals so injected. The mortality rate of the infected rabbits was 44%; the controls received injections of cultures from pyorrhea pockets of subjects showing no sumptoms of any of the above diseases and displayed the various lesions mentioned above only to a very limited degree. This contrast of the percentages in the two groups is evidence, the authors contend, of the elective localizing power of streptococci obtained from pyorrhea pockets. The specific powers of elective localization of *streptococcus viridans* was not evident with other organisms present in *pyorrhea alveolaris*. Bacteria and their toxins which are produced in deep pyorrhea pockets can find access to distant parts of the body by way of its abundant vascular supply, this study proves.—J. P.

A SIMPLE AND EFFICIENT METHOD FOR PERMANENTLY NUMBERING RABBITS.*

BY. K. L. MCALPINE.

In the routine assay of Insulin a large number of rabbits are required. The assay is greatly facilitated by injecting two groups of nine rabbits, one with the standard Insulin and the other with the unknown. One week later the groups are reversed so that the one which received the standard now receives the unknown, and vice versa. In this manner variables in the susceptibility to Insulin of individual animals tend to balance each other.



The above procedure makes it desirable and almost necessary to number permanently each rabbit because after the necessary rest period the same animals may be used repeatedly as long as they weigh between 1800 and 2200 Gm. Various forms of tags, clips and rings have been used with more or less success, but often these produced injury to the ear, thereby interfering with the bleeding. Branding with a toothed punch caused infection at times. Numbers printed on with various dyes and pigments, such as methylene blue, fuchsin, safranin, picric acid, indigo carmine, indelible ink, India ink, etc., although brilliant when applied, soon faded and became obliterated.

To overcome these difficulties, the following method has been devised and found very satisfactory: The hammer of a discarded electric bell is bent at right angles to the armature and a sewing needle is soldered to the bent portion. A toy transformer attached to the light circuit may be used as a suitable source of current, although any other 6-volt supply is equally efficient. The numbers are written on the inner surface of the ear with India ink and while the ink is still wet, the vibrating needle is run along the numbers, thus tattooing the pigment into the skin. This process is very rapid; a rabbit may be tattooed with a 3-digit number in about two minutes. The animal experiences little discomfort and no blood is drawn. The numbers put on by this method are permanent. No infections have been observed.

BIOLOGICAL LABORATORIES,
H. K. MULFORD COMPANY,
GLENOLDEN, PENNA.

* Scientific Section, A. PH. A., Portland meeting, 1928.

LIMITATIONS OF THE ANTIMONY TRICHLORIDE TEST FOR QUANTITATIVE ESTIMATION OF VITAMINE A.*

W. S. JONES, A. E. BRIOD, S. ARZOOMANIAN AND W. G. CHRISTIANSEN.

An accurate chemical test for the vitamine content of cod liver oil would be of tremendous value; it would result in the saving of much time and money to those who must at present assay the oil biologically and it would provide a means of investigating cod-liver oil to those who are interested in the potency of this oil but unable to perform the biological tests. Moreover such tests would greatly facilitate the correct development of the industry which produces the crude oil from the livers. Although practically no progress has been made with respect to a chemical test for the vitamine D present in cod liver oil, the studies of the vitamine A content of the oil have resulted in the development of certain color tests which have been of sufficient promise to warrant intensive study. The antimony trichloride test (1,2) which has been applied to cod liver oil produces a blue color which could be used as a measure of the vitamine A potency of the oil provided that in all cases the intensity of the blue color is proportional to the vitamine A content of the oil.

In order to measure and express the intensity of the blue color developed by the antimony trichloride test two methods were studied.

(*a*) USE OF COPPER SULPHATE STANDARD.

For the determination of vitamine A potency by this method a standard blue color is first prepared with a copper sulphate solution of definite strength. A 30% chloroform solution of an oil of known vitamine A content—biologically assayed—is made up and several drops of this solution are then added to 2.0 cc. of the saturated antimony trichloride solution in chloroform, until a known number of these drops has been found to produce a color which matches the previously prepared copper sulphate standard color. The unknown oil is then tested in the same manner and the potency of the unknown is calculated by assuming that potency is inversely proportional to the number of drops found necessary for a match of the standard color.

One of the chief objections to this method is that it does not permit an accurate reading of the blue color inasmuch as variable amounts of red and yellow also develop in the reaction mixture. Though this defect can be partly overcome by the use of a few drops of cobalt and ferric chloride solutions in addition to copper sulphate, the use of Lovibond standard glasses, as described below, is much to be preferred.

(*b*) USE OF LOVIBOND COLOR GLASSES.

The method used was essentially as suggested by Wokes and Willimott (2) and all our results were in complete agreement with their findings as to the best procedure to be followed. In this method, a saturated solution of antimony trichloride in chloroform is prepared and 2.0 cc. are placed in a Lovibond color test-tube. To this is then added a definite amount of a 30% chloroform solution of the oil so that a reading preferably between 5.0 and 12.0 Lovibond blue units is obtained—

* Scientific Section, A. PH. A., Portland meeting, 1928.

0.1 to 0.4 cc. of the oil solution will generally suffice. The color produced is immediately read in a Wesson tintometer with Lovibond glasses and expressed in blue units, though red and yellow are also used in the actual reading, if found necessary, to facilitate an accurate matching of the blue color. The test is strongly influenced by such factors as temperature, time and concentration of the reagents, and the recommendations of Wokes and Willimott (2) in respect to these factors must be closely adhered to.

RELATIONSHIP BETWEEN COLOR TEST AND BIOLOGICAL ASSAY.

In order to be able to draw conclusions regarding the vitamine A potency of an oil from the intensity of the blue color, it is necessary to know exactly how the color produced by a biologically assayed sample varies when this oil is diluted with known quantities of a vitamine A free oil so as to produce samples which would have 75%, 50%, etc., of the potency of the original oil. To accomplish this object a standardized sample of cod liver oil was diluted with deodorized peanut oil to definite concentrations and therefore to known vitamine A potencies; the peanut oil produced no blue color when tested by the antimony trichloride method. The resulting oils were then tested colorimetrically.

TABLE I.—AMERICAN COD LIVER OIL.

Oil mixture. % Cod Liver oil.	% Peanut oil.	Vit. A potency U. S. P. Units.	Color reading Lovibond blue units, 0.2 cc. of 30% $CHCl_3$ vol. of oil.
100	0	715 (biological assay)	12.4
66.7	33.3	477	8.3
50	50	358	6.3
33.3	66.7	238	4.3
16.7	83.3	119	3.0

The above work was repeated on European oil also biologically assayed and the following results were obtained, using first 0.2 cc. and then 0.4 cc. of the 30% solution of oil in chloroform.

TABLE II.—EUROPEAN COD LIVER OIL.

Oil mixture. % Cod Liver oil.	% Peanut oil.	Vit. A potency U. S. P. units.	Color reading Lovibond blue units. 0.2 cc.	0.4 cc.
100	0	425 (biological assay)	7.6	15.2
66.7	33.3	283	5.8	11.5
50	50	213	4.0	8.0
33.3	66.7	142	3.4	6.7
16.7	83.3	71	1.9	3.7

When the above results were plotted (Fig. 1), two straight lines were obtained within the experimental limits of error, showing that the intensity of the reaction color is a linear function of the amount of oil present and its vitamine A potency.

It is evident that these two lines, which were obtained by using biologically assayed samples of cod liver oil, lie very close to each other and it might be that if a sufficiently great number of oils of both types were used a single line would be obtained. However, this fact must not be considered to indicate that American and European cod liver oils are of equal potency; Tables I and II indicate that the

particular samples of American and European oils which were used possessed vitamine A potencies of 715 and 425 U. S. P. units, respectively, as determined biologically.

Inspection of the above results shows that the blue color obtained with the samples produced by dilution of a standard sample of cod liver oil is directly proportional to the vitamine content of the diluted samples. Therefore, if the color test may be implicitly relied upon, one should be able to take a series of unknown samples and using either a known sample as a control or calculating the results from the above graph determine the potency of the unknowns. A series of thirteen oils which had been biologically assayed was selected and colorimetrically assayed using a standard sample as a control (the person making the test did not know the biological assay of the unknowns). The results are tabulated below.

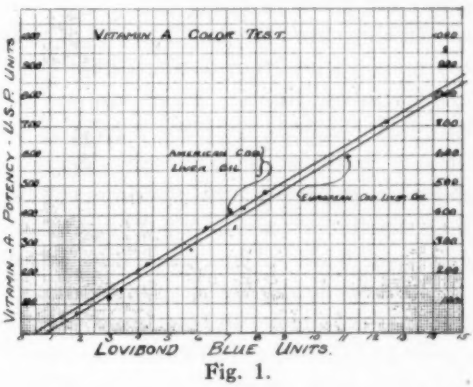


Fig. 1.

TABLE III.—BIOLOGICAL ASSAY VS. COLORIMETRIC ASSAY.

Sample no.	Source of oil.	Vit. A assay. Biological.	Vit. A assay. Colorimetric.
		U. S. P. units.	
1	American (control)	667	667
2	American	715	750
3	American	1000	648
4	American	832	2335
5	American	770	935
6	American	715	365
7	American	770	1780
8	American	715	825
9	American	588	890
10	American	667	4475
11	American	832	1000
12	European	450	400
13	European	450	442
14	European	450	488

These results show that only five of the thirteen unknowns yielded colorimetric assays within 110 U. S. P. (2 to 15%) units of the biological assay; of the remaining eight, all oils except 2 (Nos. 3 and 6) gave colorimetric values which exceeded the biological assay by from 20 to 600%.

TABLE IV.

Sample no.	Source of oil.	Vit. A assay. Biological.	Vit. A assay. Colorimetric.
1	American	833	1700
2	American	770	842
3	American	562	750
4	Japanese	833	1000

A second set of four unknowns was selected and tested by an operator different from the one who tested those recorded in Table III. In this case, instead of using a control oil the results were read from the lines given in Fig. I using the experimental values found for the blue color as expressed in Lovibond Units. These results are given in Table IV.

In this case also it will be noted that the difference between the results of the two tests varies from a small difference (9%) in oil No. 2 to a large difference (100%) in oil No. 1. From the work reported on these two sets of unknowns one must conclude that the color test for vitamine A in cod liver oil has its limitations; until we have certain definite knowledge of the constituents of the oil which are related to the development of the blue color and the manner in which these substances are affected qualitatively and quantitatively by the conditions under which the oil has existed we will not be able to apply this test successfully.

In considering the results tabulated in Tables III and IV it must be stated that the biological and colorimetric assays were not made simultaneously but that a period of 6–9 months elapsed between the two tests; the biological assays being made first in all cases except those of Sample 11 in Table III and Sample 4 in Table IV. The oils varied considerably (2 months to several years) in age in so far as the time elapsing between the data of manufacture and that at which the biological assay was made is concerned. In all cases except one these oils had been under anaerobic conditions; oil No. 10 in Table III had been exposed to air during a portion of the time whereas the companion Sample No. 4 was under anaerobic conditions all the time.

Among the factors which influence the intensity of the blue color and the extent to which this color is indicative of vitamine A potency the following are possibly of importance: the source, age, manner of production and storage.

During our future studies we intend to give consideration to these factors.

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RESEARCH DEPT. OF THE CHEMICAL & PHARMACEUTICAL LABORATORIES,
E. R. SQUIBB & SONS, BROOKLYN, N. Y.

Irradiated Ergosterol. Effect on blood. Source of increase in serum calcium induced by Irradiated Ergosterol. A. F. Hess, M. Weinstock, and H. Rivkin—*Proc. Soc. Exptl. Biol. Med.*, 28 (1928), 199.—Through *Squibb Abstract Bulletin.*

The question was investigated whether the calcium in hypercalcemia produced in normal infants and animals by ingestion of irradiated ergosterol is taken from the bones and other tissues, or is the result of increased absorption from the intenstine. When large amounts of irradiated ergosterol, *i. e.*, 1 mg. daily, were fed to young rats in whom calcium depletion of the blood was effected by the ration including 0.8 mg. Ca and 400 mg. P a day (Ca:P 1:500), it was found that without exception the calcium could be increased rapidly 50 per cent or more. The high phosphorus content of the diet interfered markedly with the absorption of calcium. The results indicate that when the diet contains almost no calcium, the calcium which is supplied to the blood on giving irradiated ergosterol is derived from the tissues.—J. P.

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ESTIMATION OF PODOPHYLLIN.

The best method for estimating podophyllin is that of "Pharm. Nederl. IV," with some modifications. An exactly weighed quantity of finely powdered podophyllin (about) 0.5 Gm. is shaken for half an hour in a glass-stoppered bottle with 15 cc. $CHCl_3$. Ten cc. of the filtered solution are put into a tared 100-cc. Erlenmeyer flask charged with 50-cc. petroleum ether. The precipitate is collected on a dry weighed filter of 8-cm. diameter, washed with 20-cc. petroleum ether, flask and filter are dried for one hour at about 70° C., and weighed after an hour's standing in the balance room. The residue, which corresponds to two-thirds of the podophyllin employed, should not be less than 50 per cent. In place of the paper filter a sintered glass crucible can be used, which is dried with the precipitate for one hour at 70° C. and weighed after cooling in the desiccator.—R. Eder and W. Schneider (*Pharm. Acta Helv.* (1926), 1, 15; through *Jahresber, d. Pharm.* (1926), 173; through *The Pharm. Jour. and Pharm.* (Feb. 9, 1929).

AN IMPROVISED NITROMETER FOR THE ASSAY OF SPIRIT OF ETHYL NITRITE.*

BY C. L. COX.[1]

Due to the fact that Spirit of Ethyl Nitrite is such an unstable preparation, and so often found of sub-standard strength in the drug store it is almost imperative that it be assayed frequently to insure its meeting the official requirements. The official nitrometer is a satisfactory method of assaying this preparation, but the cost of the apparatus is too great for the average drug store to bear. For this reason it is not unusual to find many drug stores that do not have the facilities for assaying this important spirit.

With the purpose of developing a process for the assaying, that would require little or no expensive apparatus, I have been experimenting with the various methods suggested in the past. Titration of the liberated iodine requires a burette, as also does the saponification of the ester. The Squibb's ureometer method as applied to the assay of spirit of ethyl nitrite has several points of error, but there are some principles in this process that form the basis of the nitrometer which I propose to use.

Fig. 1.—Improvised Nitrometer.

The apparatus I propose to use consists of about two feet of rubber tubing, a rubber stopper, a homeo vial, a graduate, a pinch cock, a wide mouth 8-ounce bottle, a tall 4-ounce bottle and about a foot of glass tubing.

The apparatus is set up as shown in the sketch. The 8-ounce bottle is filled with the regulation saturated salt solution and siphoned into the 4-ounce bottle until the 4-ounce bottle contains about 30 cc. of the saturated salt solution and all air has been excluded from the tubing. Now add about 10 cc. of dilute sulphuric acid and 15 cc. of potassium iodide test solution to the 8-ounce bottle. Tare the homeo vial on the prescription balance, fill with the spirit to be tested and again weigh. By means of a thread, lower the vial into the 8-ounce bottle until it just clears the stopper. Loosely insert the stopper and siphon the salt solution from the 4-ounce bottle until as much air as possible has been displaced from the 8-ounce bottle, taking care that the reagent does not enter the vial. Tighten the stopper and bringing the level of the liquids in both bottles to the same height, mark the level in the 4-ounce bottle. Now invert the 8-ounce bottle so as to mix the spirit in the vial with the reagent. Taking care that the gas generated does not pass through the tubing, agitate the bottle until the reaction is over. As soon as the temperature has become adjusted to that of the room, again bring the level of the liquids to the same height. Tighten the pinch cock on the rubber tubing, remove the stopper from the 8-ounce bottle and siphon the liquid from the 4-ounce bottle into a graduate until the mark of the first level has been reached. The liquid in

* Section on Practical Pharmacy and Dispensing, A. PH. A. Portland meeting, 1928.

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the graduate represents the volume of gas liberated from the spirit. Calculate as directed in the U. S. P.

One source of error with this apparatus is that it is impossible to displace all the air from the 8-ounce bottle, about one cubic centimeter remaining. This reacting with the gas generated causes a contraction in volume. But as the air is only one-fifth oxygen the error cannot be greater than one-fifth of a cubic centimeter. This is not greater than the error in the official nitrometer which is due to the fact that the saturated salt solution in the reservoir side of the nitrometer has a specific gravity of about 1.200 while twenty-five cubic centimeters of that in the calibrated side of the nitrometer has a specific gravity of about 1.000.

For practical purposes it is sufficient to ascertain that one cubic centimeter of the spirit evolves eleven cubic centimeters of gas. This is equivalent to about four per cent, or the mean of the pharmacopœial requirement and it would only be under abnormal conditions that barometric pressure would cause this to be above or below the official limit of toleration.

NEW JERSEY COLLEGE OF PHARMACY,
NEWARK, N. J., August 14, 1928.

A PHARMACEUTICAL STUDY OF MAGMÆ MAGNESIÆ—1900–1930.

BY A. J. LEHMAN, M.S.

Historical.—**Magma Magnesiæ** (Milk of Magnesia) made its official appearance in the N. F. III (1906). Previous to this little information can be found in the literature available, relative to this preparation. Aqueous suspensions of magnesium oxide were known and used at an earlier date, an example of which is the *Magnesia usta in aqua* in the 1871 Hungarian Pharmacopœia. In 1874, Wilder (1) offered a Calcined Magnesia Mixture consisting of 1 part of light calcined magnesia to 12 parts of water. The same year another writer (2) suggested the following formula for "milk of magnesia:"

Calcined magnesia	8 parts
Water	40 parts
Sugar	50 parts
Orange flower water	20 parts

The same article includes a formula for "Lac Magnesiæ" from the 1831 Schleswig-Holstein Pharmacopœia, as follows:

Calcined magnesia	2 parts
Rub uniform with distilled water	10 parts
Heat to boiling with constant stirring	
Remove from fire and add,	
Powdered white sugar	12 parts
Orange flower water	4 parts

The Report on the Progress of Pharmacy (3) in 1881 includes the following statement under the heading of Milk of Magnesia: "Triturate 2 parts of calcined magnesia with well boiled or distilled water. Preserve in well-stoppered vials." Dietrich (4)

(1885) five years later offered a "new formula" for "Milk of Magnesia" consisting of 10 parts of calcined magnesia to 100 parts of distilled water. In 1891, Fleury (5) suggested preparing "Magnesium hydrate" by mixing solutions of magnesium sulphate and of sodium hydroxide. The precipitate was washed and then dried at a moderate temperature. A British product (6) (1896) called Liquid Magnesia was prepared by mixing solutions of sulphate of magnesia and of sodium carbonate, washing and collecting the precipitate, mixing this with water and saturating the mixture with CO_2. The product was stored in tightly stoppered bottles to "prevent loss of CO_2." In 1900 S. B. (7) called attention to the use of the name Milk of Magnesia to a suspension of magnesium hydroxide in water. The trade patent to this name had expired in 1890. Three years later Scoville (8) (1903) offered the following formula for a Milk of Magnesia:

Magnesium sulphate	250 Gm.
Sodium hydroxide	81 Gm.
Water, a sufficient quantity to make	1000 cc.

The two chemicals were dissolved in separate portions of water, then mixed; the precipitate washed, collected and suspended in distilled water. One teaspoonful of the finished product was to contain about 3 Gm. of magnesium hydroxide. F. S. K. (9) in 1904 mentions a formula given in the "Standard Formulary" which differs from the above in ratio of ingredients and in the use of "Solution of Potassa." He also suggests that a quick method for preparing Milk of Magnesia consists of mixing light calcined magnesia 510 grains, glycerin $3^1/_2$ ounces and water $11^1/_2$ ounces. The formula offered by Scoville (8) (1903) was adopted by the N. F. III (1906). Whereas the formula and directions were quite simple, the products varied much when prepared by different pharmacists. Furthermore the manipulations as directed brought forth a number of criticisms and suggestions. As a result of the investigations the formula for Milk of Magnesia has met with several changes during the last two revisions of the official standards containing this product. In this paper an attempt has been made to present a comparative analysis of the official formulas together with a summary of such comments on this product as found in the literature available. It may be of interest to know that 110 articles were abstracted exclusive of the comments found in the *U. S. P. Revision Circulars*. This it is assumed does not represent all of the articles published.

1. TITLES AND SYNONYMS.

Milk of Magnesia was introduced into the N. F. III (1900) under the Latin title of **Magma Magnesiæ.** The 1910 and 1920 revisions of the U. S. P. retained it under the same title. The English title for both texts was *Magnesia Magma.* The synonym *Milk of Magnesia* appears in both standards. The 1910 revision of the Pharmacopœia introduced the official abbreviation **Magma Mag.,** which is retained by the 1920 revision.

Foreign Pharmacopœias have not introduced this preparation to any extent. The following is a list of titles obtained from the Pharmacopœias and other official standards:

"British Pharmaceutical Codex" (1923): Mistura Magnesii Hydroxidi, Cremor Magnesia, Cream of Magnesia, Emulsi Magnesia, Emulsion of Magnesia, Lac Magnesiæ, Mixture of Magnesium Hydroxide.

"French Pharmacopœia" (1908): Magnesium (Hydroxide De), Hydrate de Magnesia, Magnesii Hydratii, Magnesium Hydroxydatum.

In commenting on the titles for the magma Raubenheimer (10) (1907) suggests the following title: **Magnesii Hydroxidum Precipitum Plutiforme,** while Diehl (11) (1909) suggests that the title be changed to **Mistura Magnesii Hydroxidi,** and Needham (12) (1910) favors **Cremor Magnesiæ.** Hommell (13) (1920) favors dropping the synonym Milk of Magnesia, "milkily magnesia" would be more desirable. The former synonym he suggests is unscientific inasmuch as the product is not like milk outside of its color.

2. DEFINITION AND PURITY RUBRIC.

The purity rubric for milk of magnesia in the 1900 N. F. called for "about 3 grains of magnesium hydroxide to a teaspoonful." Taking an ounce of the magma as weighing 480 grains, 3 grains would represent about 5% of $Mg(OH)_2$. The 1910 revision of the U. S. P. increased the strength. It specifies that the magma must contain not less than 6.5% and not more than 7.5% $Mg(OH)_2$. This equivalent to about 3.9 to 4.5 grains in a teaspoonful. The 1920 revision changed the purity rubric to read "not less than 7 per cent of $Mg(OH)_2$;" representing about 4.2 grains per teaspoonful. (A fluidounce of a commercial milk of magnesia weighed 500 grs.) In commenting on the *Purity Rubric* Terry (14) (1919) suggests changing the requirement to 5.5 per cent, since the amount of sodium hydroxide prescribed is insufficient to produce 6.5 per cent of $Mg(OH)_2$. On the other hand Hilton (15) (1920) favors increasing the requirement to 7.5 per cent of $Mg(OH)_2$, while Lyons (16) (1920) favors 8 to 8.5 per cent of $Mg(OH)_2$ as such a product would be less liable to separate. In commenting on the report by Arny (17) (1920) that the purity rubric should be changed to "not less than 7 per cent $Mg(OH)_2$," Scoville (18) (1920) calls attention to the possible lack of uniformity because no maximum requirement is given.

3. PRESERVATION.

The National Formulary makes no statement relative to the preservation of Milk of Magnesia. The 1910 and 1920 revisions of the U. S. P. direct that the magma must be kept in wide-mouth bottles tightly stoppered with corks which have been dipped in melted paraffin.

This protective measure of coating the cork with paraffin is undoubtedly to prevent the action of $Mg(OH)_2$ on the cork, which would discolor the preparation. Hensel (19) (1915) asserts that in order to preserve the magma properly rubber stoppers should be used.

4. MAGNESIUM SULPHATE OR MAGNESIUM CARBONATE AS AN INGREDIENT.

The 1900 revision of the N. F. prescribed 250 Gm. of magnesium sulphate for the preparation of 1000 cc. of magma. The 1910 revision of the U. S. P. replaced the magnesium sulphate with magnesium carbonate, prescribing 125 Gm. for 1000 cc. of magma. The 1920 revision of the U. S. P. again directed the use of magnesium sulphate prescribing 300 Gm. for 1000 cc. of magma.

The purity rubric for magnesium sulphate and for magnesium carbonate is as follows:

1900—"Not less than 99.7 per cent of $MgSO_4.7H_2O$ or 48.84 per cent anhydrous $MgSO_4$."
1910—"A mixture of hydrated magnesium carbonate and magnesium hydroxide corresponding to not less than 39.3 per cent of MgO."
1920—"Not less than 48.60 per cent and not more than 53.45 per cent of $MgSO_4$, corresponding to not less than 99.5 per cent of crystallized salt ($MgSO_4.7H_2O$)."

Based on the purity rubric 250 Gm. of magnesium sulphate represent 121.73 Gm. of absolute $MgSO_4$; 125 Gm. of magnesium carbonate represent 49 Gm. of MgO; and 300 Gm. of magnesium sulphate represent 145.80 to 160.45 Gm. of $MgSO_4$. Furthermore:

I	$MgSO_4$ equivalent to	MgO equivalent to	$MgCO_3$	
	120.38 equivalent to	40.32 equivalent to	84.32	or,
	1.00 equivalent to	0.344 equivalent to	0.700	then,
	121.73 equivalent to	40.77 equivalent to	85.25	(N. F. 1900)
	145.80 equivalent to	50.15 equivalent to	102.06	(U. S. P. 1920)
	160.45 equivalent to	55.16 equivalent to	112.32	(U. S. P. 1920)
II	MgO equivalent to	$MgSO_4$ equivalent to	$MgCO_3$	
	40.32 equivalent to	120.34 equivalent to	84.32	or,
	1.00 equivalent to	2.985 equivalent to	2.091	then,
	49.00 equivalent to	146.25 equivalent to	102.46	(U. S. P. 1910)

SUMMARY TABLE.

Year.	Magnesium sulphate.	Magnesium carbonate.	$MgSO_4$.	$MgCO_3$.	MgO.
1900	250		121.73	85.23	40.77
1910		125	146.25	102.46	49.00
1920	300		145.80	102.06	50.15
			160.45	112.32	55.16

A difference of opinion occurred as to the correct amount of magnesium sulphate to be used. Raubenheimer (20) (1907) advocates using only 240 Gm. of magnesium, decreasing the excess, thereby leaving less to wash out. Posey (21) (1909) suggests a reduction to 224 Gm. while Diehl (22) the same year recommends 220 Gm. Hilton (23) (1911) offers a formula in which 350 Gm. of magnesium sulphate is prescribed. (The amount of alkali is increased.) Mueller (27) (1917) suggests using 270 Gm. of magnesium sulphate dried, representing about 552 Gm. of the crystalline salt. (The amount of sodium hydroxide is also increased.) A formula offered (24) (1920) prescribes 500 Gm. of magnesium sulphate for 1000 cc. of magma. Beringer (25) (1920) in commenting on this calls attention to the proposed purity rubric, *viz.* 6.5 to 7.5 per cent $Mg(OH)_2$. Using 500 Gm. of magnesium sulphate the yield would be "11.83 Gm. $Mg(OH)_2$ in each 100 cc." Little has been said on the use of magnesium carbonate. McNeery (26) (1916) suggested the use of 9212.46 grains of magnesium carbonate representing about 149.4 Gm. for 1000 cc. of magma. Mueller (27) (1917) and Corfield (28) (1923) both suggested the use of magnesium oxide in place of the carbonate.

SUMMARY TABLE.

Formula.	Magnesium carbonate.	Magnesium sulphate.	Purity rubric.	Absolute.
N. F. 1900		250 Gm.	48.59%	121.475 Gm. $MgSO_4$
U. S. P. 1910	125		39.20	49.0 Gm. MgO
U. S. P. 1920		300 Gm.	48.60 to 53.45	145.8 to 160.45 Gm. $MgSO_4$

Raubenheimer	240 Gm.	48.59	116.616 Gm. $MgSO_4$
Boehm	250 Gm.	48.59	121.475 Gm. $MgSO_4$
Bruder	250 Gm.	48.59	121.475 Gm. $MgSO_4$
Posey	224 Gm.	48.59	108.841 Gm. $MgSO_4$
Diehl	220 Gm.	48.59	106.898 Gm. $MgSO_4$
Hilton	350 Gm.	48.59	170.065 Gm. $MgSO_4$
Beringer	250 Gm.	48.59	121.475 Gm. $MgSO_4$
Mueller	270 (anhyd.)	99.50 (?)	268.65 Gm. $MgSO_4$

(*To be continued*)

SYRUP OF FERROUS IODIDE AND THE OFFICIAL HYDRIODIC PREPARATIONS.*

BY H. V. ARNY, BENJAMIN VENER AND LESLIE C. JAYNE.

INTRODUCTION.

The question of the stability of syrup of ferrous iodide and of syrup of hydriodic acid and of the diluted acid itself has been the subject of many papers. Of these at this time we will mention only papers by Haussmann (1), Alpers (2), Beringer (3), Dunning (4) and Base (5) on syrup of ferrous iodide and those by Raubenheimer (6), Sieker (7) and Lane (8) as far as syrup of hydriodic acid is concerned.

The recent pharmacopœial revision work of one of the present authors brought the subject once more to his attention from the standpoint of stability of these preparations and of their assay and the experiments reported below represents a study of the question over a period of four years:

Part I.

SYRUP OF FERROUS IODIDE.

(Work performed with Benjamin Vener, Ph.G., B.S.)

Four samples of this syrup were prepared:

A. Exactly as directed in U. S. P. IX. The fresh sample assayed 5.436 per cent of ferrous iodide.

B. As directed by U. S. P. IX with omission, however, of the hypophosphorous acid. The fresh sample assayed 5.436 per cent of ferrous iodide.

C. U. S. P. proportions of iron and iodine, hypophosphorous acid omitted, sugar 80 Gm., glycerin 70 Gm. to 250 Gm. of finished syrup. The fresh sample was not quite up to the U. S. P. requirements, assaying 4.325 per cent of ferrous iodide.

D. Iron wire, 3.2 Gm.; iodine, 10.4 Gm.; diluted hypophosphorous acid, 5 cc.; sugar, 100 Gm.; glycerin, 55 Gm.; water to make 250 Gm. The fresh sample assayed 4.921 per cent of ferrous iodide.

Samples A and B were prepared on September 25, 1924. Half of each batch was poured into small, completely filled bottles which were opened only as they were assayed. The other half of each batch was kept in its original container and was assayed regularly; hence was exposed to the action of the air. Sample C was prepared November 23, 1924, and successive samples were drawn from the original

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* Section on Practical Pharmacy and Dispensing, A. PH. A., Portland meeting, 1928.

container for assay purposes. Sample D was prepared December 17, 1924, and was assayed three times: when fresh, 10 weeks later, and finally after 19 months, sample being kept in a partially filled bottle in the interval.

In the tables which follow the several columns indicate the following observations made during the study of the samples:

Color of syrup was observed at time of assay. In other words, the darkening of the syrup upon standing was carefully observed.

Presence of scum is a characteristic of certain samples of the syrup that as far as we find has not been noted in the literature. The significance of this scum is discussed later.

Presence of free iodine was detected by the starch test. That the amount developed at any time was insignificant was shown by the fact that the iodide content of the samples remained practically unchanged during the months of observation, and also by the negative result of the starch-iodine reaction.

Percentage of Ferrous Iodide.—This assay was carried out by the U. S. P. silver nitrate—thiocyanate volumetric method. The figures show no loss in iodide content from beginning to end of the observation, the slight fluctuations in figures obtained being of no significance, since the difference between the maximum and minimum figures represent about 0.2 cc. of $N/10$ $AgNO_3$ V. S.

Color of the silver iodide refers to the frequently reported annoyance of the darkening of the precipitate obtained when the silver nitrate V. S. is added to the diluted syrup.

TABLE I.

SAMPLE A. SUCCESSIVE ASSAYS OF SAME SAMPLE CONTAINED IN AN INCOMPLETELY FILLED BOTTLE.

Age.	Color.	Scum?	Free iodine?	Titration. % FeI_2.	Titration. AgI ppt.
Fresh	Pale yellow	None	None	5.436	Reduced
1 week	Pale yellow	None	None	5.277	Reduced
2 weeks	Pale yellow	None	None	5.277	Reduced
3 weeks	Pale yellow	None	None	5.277	Reduced
4 weeks	Pale yellow	Present	None	5.35	Reduced
8 weeks	Pale yellow	Present	None	5.138	Reduced
12 weeks	Pale yellow	Present	None	5.21	Reduced
16 weeks	Pale yellow	Present	None	5.227	Reduced
20 weeks	Dark yellow	Considerable scum	None	5.227	Reduced
22 months	Very dark brown	Black ppt.	None	5.34	Reduced

TABLE II.

SAMPLE A. KEPT IN SMALL COMPLETELY FILLED, TIGHTLY CORKED BOTTLES, EACH OPENED ONLY AT TIME OF THE SPECIFIC ASSAY. THE ASSAY AT THE END OF 22 MONTHS WAS PERFORMED, HOWEVER, ON THE SAME SAMPLE USED AFTER TWENTY WEEKS.

Age.	Color.	Scum?	Free iodine?	Titration. % FeI_2.	Titration. AgI ppt.
Fresh	Faint yellow	None	None	5.436	Reduced
1 week	Faint yellow	None	None	5.277	Reduced
2 weeks	Faint yellow	None	None	5.277	Reduced
3 weeks	Faint yellow	None	None	5.19	Reduced
4 weeks	Faint yellow	Trace	None	5.277	Reduced

8 weeks	Faint yellow	Trace	None	5.21	Reduced
12 weeks	Faint yellow	Trace	None	5.21	Reduced
16 weeks	Faint yellow	Trace	None	5.227	Reduced
20 weeks	Faint yellow	Trace	None	5.227	Reduced
22 months	Dark brown	Brown ppt.	None	5.41	Reduced

TABLE III.

SAMPLE B. SUCCESSIVE ASSAYS FROM SAME SAMPLE KEPT IN AN INCOMPLETELY FILLED BOTTLE.

Age.	Color.	Scum?	Free iodine?	Titration. % FeI_2.	AgI ppt.
Fresh	Greenish yellow	None	None	5.436	No reduction
1 week	Yellow	None	Present	5.277	No reduction
2 weeks	Yellow	None	Present	5.436	No reduction
3 weeks	Yellow	None	Present	5.436	No reduction
4 weeks	Yellow	None	Present	5.436	No reduction
8 weeks	Yellow	None	Present	5.355	No reduction
12 weeks	Yellow	None	Present	5.355	No reduction
16 weeks	Yellow	None	Present	5.444	No reduction
20 weeks	Brown yellow	None	Present	5.444	No reduction
22 months	Green yellow	None	None	5.418	No reduction

TABLE IV.

SAMPLE B. KEPT IN SMALL COMPLETELY FILLED, TIGHTLY CORKED BOTTLES, EACH OPENED ONLY AT THE TIME OF THE SPECIFIC ASSAY, EXCEPT IN THE CASE OF THE ASSAYS 20 WEEKS AND 20 MONTHS AFTER PREPARATION, WHEN THE SAME SAMPLE WAS USED.

Age.	Color.	Scum?	Free iodine?	Titration. % Fe I_2.	AgI ppt.
Fresh	Pale greenish yellow	None	None	5.436	No reduction
1 week	Pale greenish yellow	None	None	5.277	No reduction
2 weeks	Pale greenish yellow	None	None	5.436	No reduction
3 weeks	Pale greenish yellow	None	Present	5.277	No reduction
4 weeks	Pale greenish yellow	None	Present	5.436	No reduction
8 weeks	Pale greenish yellow	None	Present	5.355	No reduction
12 weeks	Pale greenish yellow	None	Present	5.355	No reduction
16 weeks	Pale greenish yellow	None	Present	5.444	No reduction
20 months	Pale greenish yellow	None	Present	5.444	No reduction
22 months	Pale greenish yellow	None	None	5.418	No reduction

TABLE V.

SAMPLE C. FIVE ASSAYS FROM SAME SAMPLE KEPT IN AN INCOMPLETELY FILLED BOTTLE.

Age.	Color.	Scum?	Free iodine?	Titration. % FeI_2.
Fresh	Green yellow	None	None	4.3425
2 weeks	Brown	None	Present	4.3425
4 weeks	Brown	None	Present	4.3425
15 weeks	Brown	None	Present	4.431
20 months	Green yellow	None	None	4.412

TABLE VI.

SAMPLE D. THREE ASSAYS FROM SAME SAMPLE KEPT IN AN INCOMPLETELY FILLED BOTTLE.

Age.	Color.	Scum?	Free iodine?	Titration. % FeI_2.
Fresh	Pale green	None	None	4.921
12 weeks	Pale green	None	None	5.227
19 months	Yellow brown	Trace	None	5.108

The following comments on the four samples, A to D, supplement the tables just given:

Sample A.—The color of the sample, after 20 weeks, is a *ferric yellow* rather than an iodine brown. The "scum" mentioned in the tables refers to a grayish precipitate forming at the top of the syrup. This scum, after collection on filter paper and thorough washing with water, gave the ferric test with potassium thiocyanate and upon ignition gave off inflammable phosphine vapors. Attempts to produce a scale salt with sodium citrate was only partially satisfactory. The yellow color of the syrup was not bleached upon exposure to sunlight. After 22 months, however, serious decomposition had set in, the product was dark brown, did not bleach when exposed to sunlight, although it did not respond to the starch test for iodine and showed no diminution in iodide content.

Sample B.—After 20 weeks the scum noted in Sample A was missing. Sample darkens to brown rather than to yellow color. Color bleached on exposure to sunlight and comes back when taken away from direct sunlight, the darkening first appearing at the top of the syrup. A brownish sample responding to the starch test for iodine before bleaching by exposure to sunlight, did not respond to the free iodine test, after it had been bleached. After 22 months, however, the color had returned to a light green, there was no response to the starch test for iodine—in short, after 22 months the sample was in better condition than after 20 weeks.

Sample C.—After 20 weeks, no scum was noted; color brownish yellow rather than green; presence of free iodine indicated by the starch test. After 20 months, color was green-yellow and no free iodine could be detected by the starch test.

Sample D.—After 12 weeks, color pale green; no scum noted; no free iodine. After 19 months, color darkened to yellow-brown; trace of precipitate; no free iodine.

(*To be continued*)

HISTORY OF PHARMACY A VALUABLE ASSET TO THE PHARMACIST.*

BY OTTO RAUBENHEIMER, PH.M.

There is much more to pharmacy than the dispensing of drugs and medicines, the preparation of galenicals and incidently the sale of candy and cigars, soda water and ice cream, which side lines, in recent years, have been still further enriched by a luncheonette with such ethical signs as "Roast Beef Sandwiches" and "Clam Chowder on Fridays."

There is a fascinating field of study which should be attractive to every pharmacist and druggist who is interested in his profession, namely, History of Pharmacy, as it shows him the growth and development of his beloved calling.

It was Cicero, the great Roman orator (106–43 B.C.) who spoke thus: "History is the witness of the times, the torch of truth, the life of memory, the teacher of life and the messenger of antiquity." Goethe, the German poet and scientist (1749–1832), even went further in the words "The History of a Science Is Science itself."

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* Section on Historical Pharmacy, A. PH. A., Portland meeting, 1928.

Besides the systematic study of the History of Pharmacy of each country, may I call attention to the following important general historical facts, which I have subdivided into seven classes? Seven, from the earliest days, has always been a mysterious, if not a lucky number!

1. General Facts.—Pharmacy in the Bible; Chaldean Magicians; Egyptian priests—physicians; Greek Pharmakopoloi; Hippocrates, father of Medicine, 400 B.C. Theophrastus, father of Botany, 300 B.C.; Dioscorides, father of Materia Medica, 50 A.D.; Roman Confectionarii; Galen, father of Pharmacy, 150 A.D.; Alexandria and other Libraries; Arabian Alchemists; First pharmacy in Bagdad about 760; The Arabian School of Medicine and Pharmacy; Salerno, the first Medical School, 848, and University, 1213; Influence of the Crusades on pharmacy; Separation of Pharmacy from Medicine by the first Pharmacy Law of Frederick II in 1224; Pharmacy in the Monasteries; The Development of Apothecary Shops in Germany, France, England, etc.; Philippus, Aureolus, Paracelsus, Theophrastus Bombastus von Hohenheim (1493–1541), and Iatro-chemistry; Discovery of America and its valuable Materia Medica; Pharmacy in the United States.

2. History of Drugs.—May I call attention to the introduction and interesting history of such drugs as opium, conium, aconite, belladonna, hyoscyamus, stramonium, rhubarb, nux vomica, digitalis, strophanthus, etc., still further enriched by the contribution of the American Materia Medica in the form of cinchona, ipecac, coca, jalap, vanilla, sarsaparilla, cactus and the different dye woods? I must not forget the drugs of the United States, such as sassafras, witch hazel, cascara, hydrastis, mandrake, scullcap, sanguinaria, lobelia and many others, with which our country supplies the need of all other nations. Each of these drugs has a highly interesting history. Consult our veteran Professor John Uri Lloyd and his excellent "Origin and History of the Pharmacopœial Vegetable Drugs," a volume which should be in the library of every pharmacist.

3. Discoveries in Chemistry.—May I call attention to the many discoveries—frequently accidental—in chemistry, such as the different acids, alkalies and salts, as Glauber salt, Epsom salt and Rochelle salt, of the vitriols, antimonials, arsenicals and mercurials, of iodine and the iodides, of bromine and the bromides, and the isolation of other elements? This interesting history not only applies to inorganic chemistry, but also to the many organic chemicals, to alcohol, ether, to the alkaloids, principally isolated by pharmacists, to the coal tar derivatives and synthetic chemicals. I must not forget the first synthesis, that of urea by Frederick Woehler in 1828, just one hundred years ago, which is treated in a separate paper.

The origin and evolution of chemistry and especially of pharmaceutical chemistry is indeed a fascinating study. In connection with this I want to repeat the words of Prof. Paul Walden, of the University of Riga, the delegate from the Russian government, in his address before the Section of Pharmaceutical Chemistry of the VIII International Congress of Applied Chemistry in September 1912, of which the writer was acting secretary—"*Pharmacy is the mother of chemistry.*" The history of botany and materia medica and other allied sciences is equally as interesting and important as that of chemistry.

4. History of Galenicals.—May I call further attention to the origin and history of some of our galenicals: Vinegar of Squill by Pythagoras, 550 B.C.; Diachylon Plaster by Menekrates, 40 A.D.; Cold Cream by Galen, 150; Mercurial Plaster

by John de Vigo, about 1500, first physician to Pope Julius II; Spirit of Nitre by Franciscus Sylvius of Leyden (1614–72); Paregoric by Dr. Jacob Le Mort, professor of Chemistry, University Leyden and predecessor of the immortal Boerhaave, (1668–1738); Solution of Mercuric Chloride by Baron Gerard Van Swieten (1700–72) who together with his teacher Boerhaave established the Vienna Medical School; Spirit of Ether by Friedrich Hoffmann, 1700; Powder of Ipecac and Opium by Dover, 1725; Compound Tincture of Cinchona by Huxham, 1750; Lead preparations by Goulard, 1760; Laudanum by Sydenham, 1775 Arsenical Solutions by de Valangin, 1765, Fowler, 1780, Clemens, Pearson and Donovan, 1830; Calamine Ointment by the celebrated London surgeon Dr. Daniel Turner 1720; Compound Licorice Powder by the Berlin physician Dr. E. G. Kurella, 1795; Compound Rhubarb Powder by Dr. James Gregory of Edinburg, 1800; Compound Solution of Iodine by Dr. J. G. A. Lugol of the Hospital St. Louis in Paris, 1832; Stronger Tincture of Iodine by the Dublin gynecologist, Dr. Churchill, 1840; Pills of Ferrous Carbonate by the Paris physician, Dr. P. B. Blaud, 1820; Mass of Ferrous Carbonate by the French pharmacist, A. G. Vallet, 1837; Antiperiodic Tincture by the Austrian physician, Dr. Carl Warburg, 1840; Solution Aluminum Acetate by the Koenigsberg Professor, Dr. August Burow, 1857; and many others up to the introduction of Fluidglycerates in 1910, by that prince of pharmacists, the late George M. Beringer, of Camden, N. J?

Is it not remarkable that the names of the originators still cling to the preparations after centuries? It should be the duty of every pharmacist to know the origin and history of galenicals, especially those known by personal name synonyms.

In connection with the History of Galenicals, I beg to quote, as a ready reference, the birth of the oldest Patent Medicines, or the years when letters-patent were issued: Haarlem Oil, 1672; Godfrey's Cordial, 1720; Bateman's Pectoral Drops, 1726; British Oil, 1742; John Hooper's Female Pills, 1743; Dr. James' Powder, 1747; Roche's Embrocation, 1803; St. John Long's Liniment, 1820.

Is it not remarkable that Haarlem Oil or "Dutch Drops" after an existence of our 250 years still has a very large sale? This and other preparations, although looked down upon as "Patent Medicines" have most certainly stood the test of time.

5. *Evolution of Formularies and Pharmacopœias.*—May I call attention to the history and evolution of the Pharmaceutical Formularies and Pharmacopœias beginning with the Papyrus Ebers, 1500 B.C. and ending with the A. PH. A. Recipe Book, 1928, a lapse of 3428 years? Papyrus Ebers, 1500 B.C.; Narthex by Mantias, 270 B.C.; Dispensatory of Scribonius Largus, 47 A.D.; Antidotarium Medicamentorum Compositorum by Mesue Jr., 950, remained the authority and standby of physicians and apothecaries until the 17th century; Antidotarium Magnum by Nicolai Praepositus of Salerno, 1100; Ricettario by the College of Medicine in Florence, 1498; Dispensatory of Valerius Cordus, 1546–1666; Pharmacopœia Augustana, 1564–1673. In connection with this, may I add that Historical Pharmacy owes a debt of gratitude to the State Historical Society of Wisconsin for the publication of a Facsimile of the First Edition of this valuable work by a photographic reproduction of the copy in the library of the University of Würzburg, which contains one of the two copies still in existence? Thanks are also due to our Professor Dr. Edward Kremers for the translation of the two Essays on the subject

by the well-known authority Theodor Husemann of Göttingen which form the Introduction to this valuable book.

In the following table I have attempted to arrange the principal National Pharmacopœias in chronological order together with the local Pharmacopœias which preceded them.

1772, Pharmacopœa Danica; 1658, Dispensatorium Hafniense.

1775, Pharmacopœa Svecica.

1794, Pharmacopœa Hispana; 1762, Pharmacopœa Matritensis.

1818, Codex Medicamentarius; 1637, Pharmacopœa Parisiensis; 1732, Codex Parisiis.

1820, United States Pharmacopœia, preceded by the U. S. Army Military Pharmacopœia in 1778, the Massachusetts Medical Society Pharmacopœia in 1808 and the New York Hospital Pharmacopœia in 1816.

1864, Pharmacopœia of Great Britain; 1618, Pharmacopœia Londonensis; 1722, Pharmacopœa Edinburgensis.

1872, Pharmacopœa Germanica; 1698, Dispensatorium Brandenburgiensis; 1799, Pharmacopœia Borussica.

1888, National Formulary; preceded by several local formularies and quite especially by the New York and Brooklyn Formulary, in 1883.

The author reserves the right to go into this particular subject more extensively at a future date.

6. *History of Pharmaceutical Apparatus and Utensils.*—May I call attention to the origin and evolution of pharmaceutical apparatus and utensils, as scales, balances and weights, mortars and pestles, pill machines, alembic, retort and still, Liebig condenser, Mohr's specific gravity balance, burette, pinch cock and cork-borer, Erlenmeyer and other flasks, compressed and tablet triturate machines, vacuum apparatus, percolators, etc.?

7. *History of Pharmaceutical Processes.*—May I, last but not least, call attention to the history of the different pharmaceutical processes such as Evaporation, Distillation, Sublimation, Calcination, Filtration, Precipitation, Maceration and Percolation, Sterilization, etc.?

What a variety of subjects! What a mine of interesting and valuable information! In the above seven "cardinal points" I have only outlined the principal features which History of Pharmacy has to deal with. It does not seem possible that one brain could master it all, but the subject is by no means complete. This is the reason that the newly-formed Gesellschaft für Geschichte der Pharmazie (Society for History of Pharmacy) has subdivided this immense subject among its collaborators as pointed out in my last year's paper.

Every calling, trade, art and profession—including pharmacy—has its history. It is the duty of every pharmacist to become somewhat acquainted with this interesting and fascinating subject. Above all, the knowledge of history of pharmacy is a valuable, a very valuable asset to the pharmacist. It places him above, far above, his competitors. He is looked upon by his customers and the community at large with respect. He is again a professional man as in olden times. Now, since we have an excellent book on this subject in the English tongue, namely, LaWall's "Four Thousand Years of Pharmacy," there is no more excuse for neglecting this interesting study of History of Pharmacy.

THE SPIRIT AND SERVICE OF PHARMACY.

(Delivered as a radio talk from Station WPTF, Raleigh, N. C., on March 11, 1929.)

BY J. G. BEARD.*

In order that the subject of this talk, "The Spirit and Service of Pharmacy," may be accepted in its broadest implications, it is necessary first of all to explain what is really meant when the word "Pharmacy" is correctly used.

Two definitions are given for it. (1) A place where drugs are compounded and sold. In other words, a drug store. This definition deserves very little consideration because of its incompleteness. (2) Pharmacy is the Science and Art of Collecting, Elaborating or Preparing, and Dispensing Drugs, Medicines and Poisons.

Please consider the full meaning of the second definition. From the time the crudest, simplest herb or animal product or ore is taken from its native source, until it has been sent on its way to prevent or cure disease, no other agencies and processes than those belonging to Pharmacy have been in motion. The difference and distance between poppy juice in Asia Minor and morphine in an American hospital are tremendous, but the whole route of travel is engineered by a pharmaceutical personnel. A cinchona tree is stripped of bark in the jungles of Java, and a chain of processes then begins that ends only when quinine, an indispensable agent in controlling malaria, is available for administration. The collection, importation, elaboration and sale of this and all other drugs are exclusively managed under the auspices of a science that is perhaps less widely advertised than are any of the major technical practices.

The average layman thinks of Pharmacy in terms of the average American drug store—and he does not even understand a drug store. To him Pharmacy is a merchandising enterprise that distributes a variegated assortment that includes medicines among other items. He does not see the ramifying and intricate processes that finally focus in the prescription room of the corner drug store. The packaged medicine that he purchases there may have had its origin in the depths of an African forest; it may have gone through manufacturing methods requiring the utmost exactness and scientific skill; it may have been blended with other therapeutic agents by the druggist in a dispensing service that only one in every fifteen hundred persons is competent to render. But the final buyer—the layman—sees nothing of the complicated and costly procedures that led up to his purchase. All that he sees is a bottle of something for which he believes he paid too much.

I am asking you this afternoon to accept a broader, fairer conception of Pharmacy than the average citizen holds; asking you to analyze with me the definition of a moment ago. "Pharmacy is the science and art of collecting, elaborating, and dispensing drugs and poisons." It is not simply a science nor merely an art, but a combination of both. Science is systematized knowledge; Art is knowledge made efficient by skill. The laws and principles of Pharmacy are exhibited in an ordered and inter-related system, and they appear in the character of a science. These same laws and principles are then applied by means of skillful technique in

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the preparation of a refined medicine from crude material, and therefore they become the working rules of an art. Consequently we say that Pharmacy is a combination of science and art.

It comprehends three distinct functions, namely, collecting, manufacturing and distributing drugs.

A word about collecting. It is perhaps no exaggeration to say that in no other field of effort is it so necessary as in Pharmacy to search the entire world for raw materials. Every country on the globe, every hamlet almost, and every division of nature, are levied upon to furnish the vast supplies that are needed to satisfy society's demand for agents against disease. Savages and scientists, earth, air and ocean, contribute to the collection that Pharmacy secures in promoting the health interests of mankind. Startling stories could be written around the collection of any one of a dozen drugs that in their finished form show no hint of the thrill and danger that were involved in taking them from their native surroundings.

After a crude drug has been collected, it is deprived of non-essential material and usually sent to an exporter in some seaport city who has customers all over the world. The exporter grades the crude drug according to quality and fixes its price in relation to market conditions. He then ships it either to a firm of drug dealers or else to some manufacturing house. If the shipment goes directly to a manufacturer, and this plan is usual nowadays, the first step in the refining process is then begun. Some drugs, such as Balsam of Peru and Gum Arabic, require very little treatment to make them ready for final use. Most drugs, however, must be milled, purified and elaborated by tedious and expensive processes before they are ready for shipment to the wholesalers, who are usually the next unit in the system of supply. Ordinarily his establishment is simply a depot for quantity distribution, but oftentimes it is also a small-scale manufacturing plant. The main function of a wholesaler is to maintain a stock of between fifteen and sixty thousand drug store items in quantities sufficient for the needs of one hundred and fifty retail patrons. Located in convenient centers, able to carry infrequently used items that no single retailer could afford to stock, and affording a rapid delivery service, the wholesale druggist is a very important element in getting drugs from their source to their users.

The final unit in the scheme of drug production and distribution is the retail pharmacist. His 56,645 drug stores, scattered over this country in the proportion of one store to every three thousand persons, are the agencies in dispensing the vast number of remedial substances that go to make up our modern materia medica. The part played by the retail pharmacist in the plan that has just been sketchily described is at once as necessary, important and exacting as that of any of the others, and yet when all factors are considered he is rewarded less generously than any member of the producing personnel.

Having learned what Pharmacy is and having seen that its energies range far beyond the confines of the corner drug store, let us examine briefly what Pharmacy seeks to do; what service it tries to render. Naturally its aim centers in drugs, but as will be pointed out later, a certain amount of attention must necessarily be paid to products that only by association can be related to drugs. The fundamental obligation, the primary duty of Pharmacy, is to provide conveniently,

quickly and at moderate cost an unfailing supply of agents that prevent, alleviate or cure pain and disease.

In carrying out this purpose, Pharmacy searches constantly for new drugs and experiments unceasingly in an effort to improve the quality and effectiveness of those already in use. Every generation has found its medicines more active, more palatable and more reliable because of the extensive research conducted and financed by pharmaceutical manufacturers, teachers and distributors. In recent years this search for drug additions and improvement has been singularly fruitful. A generous share of credit for this progress belongs to chemists, physicians and others, but since drugs as such are the primary concern only of pharmacists, and since they have enormous facilities for carrying on their operations, it follows naturally that they—the pharmacists—have played the major part—oftentimes the only part—in improving the character and usefulness of modern medicines.

To illustrate:

A decade ago cod-liver oil was a highly nauseous product tolerated only by strong stomachs and almost in disrepute by physician and layman. To-day, by clever manufacturing methods, it is no more objectionable than olive oil. Furthermore it is treated by electric rays and in other ways so that it has become the main medium for administering the vitamine that prevents and cures rickets in children. In addition it is highly nutritious.

Or consider digitalis, a drug that has no satisfactory substitute in certain heart conditions. A generation ago its strength was indeterminable because its unstable constituents could not be measured by any known assay method. In an emergency a doctor was never quite certain that he could count upon its usual stimulating effects. Pharmacy concentrated upon the digitalis problem; removed certain objectionable elements such as fat; joined forces with the pharmacologist; found that the effect of the drug upon a frog's heart was an index of its strength; and finally developed standardized digitalis preparations that are potent, reliable and permanent.

Turning to another type of drug we find that serums and vaccines are becoming increasingly numerous, effective and reliable as pharmaceutical research supplements the work of the bacteriologist and physician in extending the scope of biological therapy.

The discovery of Insulin, still another class of drug, is credited altogether to two Canadian physicians, and so it should be. But the lay world knows nothing of the unselfish service of a large pharmaceutical firm in making Insulin available quickly and cheaply. Every facility of the big plant was utilized, profits were forgotten, and very shortly the world was provided with a plentiful supply of standardized drug that controls diabetes.

But pharmacists are not simply the developers or refiners of therapeutic agents that are discovered by other scientists. For example, the first alkaloid ever to be isolated was Morphine. Sertürner, a European apothecary, separated it from opium in 1815, and named it in honor of Morpheus, the god of dreams, who in mythology was the servant of Somnos, the god of sleep. His discovery and the publication of his methods so stimulated investigation into vegetable drugs that other pharmacists in rapid order announced the finding of quinine, strychnine, atropine, codeine, nicotine, picrotoxin, etc. Iodine was made known by Courtois,

a French apothecary. Bromine likewise was a pharmaceutical discovery. The list is numerous and is constantly being added to. The contributions that pharmacists make to medical science have oftentimes been credited wrongly to physicians, chemists or biologists simply because of a trait that is one of the finest features of pharmaceutical service; the trait, namely, of thinking almost entirely in terms of results and almost indifferently in terms of credit. The thing discovered or improved, and not the discoverer, is the paramount factor in the tradition of a true pharmacist.

A final word now about the retail distributor of drugs.

In its heart the public feels rather kindly towards the neighborhood druggist, but with its tongue it often speaks of him in sarcastic sentences. It jests about his high prices and his huge profits and the great variety of his stock, but in its serious moments it recalls memories of his countless courtesies and recognizes the nature of his necessary service. People say that druggists realize greater profits than other retailers. But do they? How often do you hear of one retiring? How many rich druggists do you know? They will average working more minutes per hour, more hours per day, and more days per lifetime than any class of citizens you can name. If their profits are great, why do they stay poor and nearly always die in harness? Many people continually complain about the high prices of drugs, particularly prescriptions. These unknowing critics estimate that a bottle and a cork, a grain of drug and a gill of water, go to make up a product that costs about five cents and sells for fifty. The forty-five cents difference is "pure velvet." Such an assumption is so absurd that it would be ignored were it not for the fact that a great many laymen hold notions equally ridiculous about profits on drugs. As a matter of fact there is not a wide margin of profit in the retail drug business. Of the average dollar that comes in over the counter, sixty-five cents goes to pay for the goods sold; twenty-eight cents is paid out for operating and carrying expenses; and seven cents is retained as net profit. Is this unreasonable? So much for prices and profits. A word now about stock.

The reason for the wide variety of goods that a modern druggist displays, and for the unrelated character of many such items to drugs, is easy to understand but is not generally recognized. Numerous side lines have to be carried in drug stores to keep the stores in existence. If everything but medicines and sick-room supplies were eliminated from the stock, then immediately two-thirds of all the drug stores in America would close their doors. Only the populous centers could support the other third. Cities or districts containing less than eleven thousand people could not maintain even one such drug store. Please pause and study that statement; only communities of eleven thousand people could have one drug store. But with side lines to help absorb operating expenses and to speed up turnover and profits, the number of drug stores can be increased until even small neighborhoods are provided with convenient, capable and courteous service, not only in drugs, but in the thousand other items that have found a secure place on drug store shelves. I do not apologize for side lines; they help us to realize the American idea of wanting to get what we want to have very shortly after we have decided we want it.

In concluding let me say that Pharmacy in its collective phases has assumed a solemn obligation in its account with Society. On the one hand it dedicates itself to the purpose of securing for sufferers and for those who heal suffering a

plentiful supply of increasingly effective preventives and curatives. On the other hand it obligates itself to deliver efficiently, courteously, promptly and non-expensively the varied drugs that must always be needed in the battle agaist disease. Other activities will be secondary and supplemental, performed at no sacrifice of the dominating purpose, but simply in order to make achievement more certain.

This is the Spirit and the Service of Pharmacy.

HISTORICAL FRAGMENTS.*

BY EDWARD KREMERS.

NO. 21. A GERMAN DIARIST IN SOUTH AMERICA.

Charles, the oldest son of Archduke Philipp of Austria and of Joanna (the insane daughter of Ferdinand II of Aragon and Isabella of Castile, the protectors of Christopher Columbus), also grandson of the Emperor Maximilian I, reigned as Charles V from 1519 to 1556, Emperor of the Holy Roman Empire of the German Nation, and as Charles I, King of Spain. Of his empire it was said that the sun never set therein.

The year in which Charles V was proclaimed German Emperor, was the year in which Cortez conquered Mexico. Ten years later Pizarro overran Peru. Again ten years later, 1539, De Soto landed at Tampa Bay and in 1541 reached the Mississippi river where somewhat later his remarkable career as explorer of what now constitutes our southern states ended. About the same time Coronado explored corresponding territory west of the Mississippi. In 1534 Don Pedro de Mendoza organized a fleet of 14 vessels and 2500 Spaniards and 150 Germans for an expedition to the Rio della Plata or Parana river. The fleet touched the Canaries and Hesperides, then at Rio de Janeiro in Brazil and finally at Buenos Aires in Argentina. From here expeditions were sent into the interior.

An account of this expedition of exploration and conquest has come down to us from Ulrich Schmidel of Straubing (Bavaria). It is a matter of fact statement of almost twenty years of ups and downs through South American wilderness from the 35th degree of southern latitude northward to the tropic of Capricorn. As to latitude this southern territory corresponds roughly to that traversed north of the equator by De Soto. How any one could survive twenty years of such constant hardship and danger is well nigh incomprehensible, yet Schmidel survived to tell the tale (1) to his old neighbors in Straubing with whom he continued to live upon his return—four times he was elected their burgomaster—until religious differences caused him to move to Regensburg, where he died.

Schmidel's account, like the Hidalgo of Elva's relation of De Soto, goes into minute details as to places visited, the distances traveled, density or scarcity of population, the food of the Indians, and the kind or absolute absence of clothing. He also refers occasionally to diseases and relates that they stopped to allow the

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* Section on Historical Pharmacy, A. PH. A.

wounded to recover. But there is not a single reference to a drug or remedy whether for internal or external use. In this respect Schmidel's account, like that of his northern contemporary just referred to, is a disappointment to the student of pharmaceutical history. There is, however, one aspect that is of interest.

The Levant trade, so far as central and northern Europe was concerned, was plied largely by Venice and Genoa. The principal customer of Venice beyond the Alps was Germany. The Hanseatic cities, Nuernberg (2) and Augsburg (2), in southern Germany distributed the goods, spices and aromatics, to Hanseatic merchants in Antwerp, Bremen, Hamburg, Luebeck and Danzig. From these cities on the North and Baltic seas the goods were carried to England, the Scandinavian countries and the Baltic provinces. Of such importance were the Hanseatic agents in London that the principal coin, the pound sterling, derived its name from them, known in London as the Easterlings.

These city states were not only strong enough to have their own republican form of government within the Empire and to wage war, if need be, against the Emperor; their citizens were sufficiently rich to loan large sums of money to the Emperor. Thus legend will have it that the Fuggers (3) of Augsburg and the Welsers (4) of Augsburg and Nuernberg loaned Charles V twelve tons of gold which he naturally did not pay back. In its stead he gave these German merchant princes of the sixteenth century a concession in Venezuela. A later Spanish king, who like Pharaoh of old had forgotten Joseph, deprived the heirs of the original owners of their properties in South America.

With the downfall of the Levant trade due to Mohammedan interference and the consequent development of the water routes to both the West and the East Indies, the Hanseatic merchants were naturally anxious to secure a footing in the India trade that developed in Seville, where resided the Council of the Two Indies. General history tells us about all this, but it does not afford the pharmaceutical historian the satisfaction of tangible events and names. A few such are gleaned from Schmidel's "*Wahrhaftige Historie.*"

As already pointed out, Schmidel in his first chapter relates that in addition to 2500 Spaniards, there were 150 Germans ("Hochteutsche, Niederlaender und Sachsen") who gathered in Cadiz to take part in the expedition. More than that, we are informed that one of the vessels belonged to Herr Sebastian Reudhart and Herr Jacob Welser of Nuernberg who were sending their factor Heinrich Peime with a body of merchants to Rio della Plata. Of their dealings we are not advised.

The letter that calls the explorer back to his home is delivered to him through the agency of Cristoph Reiser, who was the Fugger factor in Seville, Spain. Shortly thereafter he learns that a ship had arrived at a Brazilian port which belonged to a Herr Johann Huelsen, a merchant of Lisbon, Portugal, who was factor to Erasmus Schetz of Antwerp. Somewhat later he arrives at S. Vincente in Brazil where he is well received by Peter Roessel who is the local factor of Erasmus Schetz. The vessel had meanwhile been laden with sugar, Brazil wood and cotton and on it our explorer returns to Europe. Of the place of embarkation he notes that all "Christians" men, women and children, were engaged in making sugar.

The Levant-Venice-Hanseatic trade consisted to no small extent of spices and aromatics which were important items of the *materia pharmaceutica*. Sugar was also an important ingredient of syrups, electuaries, etc. Though the information is

exceedingly meagre, Schmidel's account gives us a direct insight into the ramifications of the Hanseatic merchants *via* Spain into the new world and informs us that sugar and a dye wood constituted two of the three items of the cargo of the Hanseatic vessel with which he returned.

(1) *Wahrhaftige Historie einer wunderbaren Schiffahrt, welche Ulrich Schmidel von Straubing von 1534 bis 1554 in America oder Neuewelt bei Brasilia oder Rio della Plata getan. Was er in diesen neunzehn Jahren ausgestanden und was fuer seltsame wunderbare Laender und Leut er gesehen.* New edition by Engelbert Hegaur, Muenchen. Im Verlag von Albert Langen.

(2) These two "Reichsstaedte" produced the first pharmacopœias north of the Alps: Cordus' Dispensatory appeared in 1546 and Occo's in 1564. Cologne one of the principal commercial centers on the Rhine followed in 1565.

(3) In 1370 the Fuggers became citizens of Augsburg. All of the branches of the family appear to have developed men of distinction. During the reign of Charles V, they played an important rôle not only in Augsburg, but throughout the empire and Spain. Pharmaceutically, it is of interest to note that the *Pharmacopoea Augustana* of 1597, edited by Occo, was dedicated to Octavianus Fugger II and Querinus Reblinger II. The editor of the earlier 17th century editions of the *Augustana*, Raimundus Minderer, of **Spiritus Mindereri** fame, dedicated several of his treatises to members of the Fugger family. This is true of his *Aloedarium*, also of his *Medicina militaris*. The latter (1619) was dedicated to Captain Otto Heinrich Fugger. (See Husemann's essays on the **Ph. August.**)

According to Schelenz (*Geschichte d. Pharmazie*, page 429) the Fuggers possessed a monopoly of the trade in tobacco, sarsaparilla, guaiac and mercury in Almeda from 1525 to 1645. From the fact that Count William of Hessia in 1575 ordered not only guaiac and tobacco from Fugger but also a description of the latter, Schelenz assumes that this world firm issued reports on the newer materia medica (*Ibid.*, page 430).

A number of years ago, the *Daheim* reproduced a painting by P. Messerschmidt entitled **"Aus der Zeit der Fugger,"** which may well serve as an aid to the imagination to picture commercial scenes of the 16th century.

(4) Originally an Augsburg family, a Nuernberg family branched off in the 15th century and an Austrian family in the 16th century. Bartholomaeus, who, with Fugger, loaned Charles V large sums of money (it is said 12 tons of gold) was made an empirical councilor. In 1527 (*i. e.*, seven years earlier than the expedition joined by Schmidel) he equipped three vessels in Spain that sailed to America under the command of Ambrosius Dalfinger of Urlen who took possession of the province of Caracas, which the Emperor had given him in trust. However, as early as 1546 the Spanish colonial authorities took back the possessions and a young Welser was executed. About the same time the Welsers and other Nuernberg merchants sent a vessel to the East Indies to establish new commercial connections.

The most illustrious, however, of the Welsers is a niece of Bartholomaeus, *viz.* Philippine Welser. While in castle Brozesnic in Bohemia with her relatives, Archduke Ferdinand, son of the Roman Emperor, met her. They were married in 1557 and became reconciled with the irate king in 1559. One of the sons became a cardinal. The other son entered military service and was elevated to the rank of a count. Philippine died April 24, 1580 in Tirol. Her romantic story has been dramatized by Redwitz.

Das Rezeptbuch der Philippine Welser is the title of an article by O. F. Zeckert which appeared in the *Pharm. Monatshefte* for 1924. No. 1.

The *Daheim* for 1910 reproduces a portrait of Philippine Welser by Lukas Cranach.

At the time that President Cleveland seemed to want to precipitate a war between England and the United States because of South American boundary disputes, the same weekly published a popular account of this family's exploits in the new world entitled "*Venezuela der Welser Land.*"

THE SLOT-MACHINE DRUGGIST.*

BY H. V. ARNY.

In 1915 I wrote an editorial (*Drug. Circ.* 59, 1915, 353) in which among other things I had this to say about the then observed tendency of pharmacists to sell the products of other people rather than medicaments put up in their own stores:

> But, if we view the same topic from the standpoint of the druggist, if we ask ourselves, "How soon will the 'original package' idea pervade the drug business as it has the grocery trade?" we are apt to experience a feeling of alarm. . . . . It causes the druggist to stop and think what his calling will be when it is reduced to the vending of other men's commodities. That this danger is very real no one that has given the subject any attention can possibly gainsay. . . . . If the druggist is contented to merely drift along as a vendor of other men's goods, he will find that his drifting will end in disaster.

In 1928 these predictions have become verified and we see the average druggist of to-day merely a vendor of other men's goods. In fact we are confronted with the distressing situation where, in some stores at least, the only manufacturing carried on in the pharmacy is the making of soups and sandwiches and salads and sundaes; where all articles of medicinal character sold over the counter are not only the products of large manufacturers but are actually dispensed in the manufacturers' original packages. If this means up-to-date retail pharmacy why not install "Automat" drug stores (like the "Automat" eating places of our larger cities) wherein the drug consuming public may drop quarters or dimes in the slot and receive in return the packaged medicament?

This paper is not intended as an attack on any branch of the drug trade. For a decade or more, I have endeavored to the best of my ability to promote good feeling between all of the several subdivisions of American Pharmacy. Nor is it easy to place the blame upon any single branch of pharmacy, for each has contributed perhaps to the present unfortunate situation wherein the average retail drug store has degenerated into a bazaar and an eating house.

Instead of finding fault let us attempt to find a way out. I believe that every trained pharmacist who reads these lines will admit that he is no more satisfied with the situation than I am. I believe that the logical outcome of present trend unless checked will be the absorption of the entire retail drug business by groups of capitalists who are ready to invest in anything (be it railroads, restaurants, cigar stores or pharmacies) which give promise of yielding dividends. I can even imagine that just as the retail shoe stores of fifty years ago have given place to the present-day chains of shoe stores conducted by shoe manufacturers, even so, despite pharmacy ownership laws, we may find pharmaceutical manufacturers running the drug stores of this country. I say "I can even imagine" advisedly, for there is a big "IF" in the way; the "IF" being *provided those pharmacists who are deeply interested in their prescription departments sit supinely by and permit*

* Section on Practical Pharmacy and Dispensing, A. PH. A., Portland meeting, 1928. After acceptance of the paper, it was referred for consideration by the incoming President of the ASSOCIATION.

pharmacy to degenerate into a mere business of vending, and that ultimately destined to be gobbled up by promoters.

Fourteen years ago (JOUR. A. PH. A., 3, 1914, 1542) I suggested that the prescription pharmacists of America get together in an organization which I dubbed the "American Institute of Prescriptionists." This month (*American Druggist*, Aug. 1928) I have published a second paper on the "American Institute of Prescriptionists." In the fourteen years the pharmaceutical situation has suffered a radical change. In 1914 such an "Institute" seemed advisable to promote the interests of the high grade prescription pharmacists of this country. Now such an "Institute" seems *essential to save the profession of pharmacy.*

The place to save the profession of pharmacy is in the retail pharmacy itself. The manufacturer may produce, the jobber may distribute, the editor may write, the teacher may preach, but in the ultimate analysis it is the retail pharmacist who directly serves the public. If he serves the hungry with soups and sandwiches he may be performing a service but he is not following the profession of pharmacy. If he furnishes beauty aids to the near-beautiful he may be performing a service but he is not following the profession of pharmacy. If he acts as a machine shooting forth packaged goods of other men's manufacture, each time a dime or a quarter is dropped into the slot, he may be performing a service but he is not following the profession of pharmacy.

It is the prescription pharmacist alone who can save the profession of pharmacy and he can only do it by means of an organization conducted entirely by prescription pharmacists. It is a task that cannot be done by manufacturers, by jobbers, by drug journalists or even by loquacious college professors. It is a job for the pharmacists who love their prescription work more than any other part of their business.

Of course the "American Institute of Prescriptionists" (first suggested in 1914 and brought out and dusted off this month) is merely the germ of the idea of what the organization of prescription pharmacists should really be. There are lots of flaws to be found in the original plan, but it is something to start on and it seems to some of us *that now is the time to start.*

Let us see whether a start cannot be made this week in Portland. A college professor has made the preliminary suggestions and is willing to talk things over with a group of prescription pharmacists. But the organization itself must be run by prescription pharmacists, themselves, unencumbered by entangling alliances.

Stardust.—Verses of all sorts. By ROBERT RAYMOND LAMPA. Boards; $5\frac{1}{2}$ by $8\frac{1}{4}$ inches; 51 pages; $1.25. New York: Swenarton, Sallary & Collins, Inc., 1929.

Many of the readers of the JOURNAL will remember the author and poet who is responsible for "Stardust" in business and fraternal associations, and in social gatherings; some will be reminded that on occasions he extended fraternal greetings in meter and rhyme and spoke memories' thoughts in measured lines, even though he warns that "critics in search of perfect rhyme will fail to find it here."—*Foreword* of "Stardust."

The Veteran of N. Y. V. D. A. has given poetic treatment to thirty or more subjects in which he has sung of country, section, faith, music, fraters, friends and flowers; he has dreamed and reminisced; smiled and greeted in welcomes; cheered joys and successes, and lamented losses and sorrows.

DEPARTMENT OF BUSINESS MANAGEMENT

Conducted by Paul C. Olsen.*

COMMENTS, QUESTIONS AND SUGGESTIONS ARE INVITED AND WELCOME.

Readers are invited to submit comments, criticisms and suggestions regarding the material which appears in this department. The Editor also will undertake to answer questions regarding general problems of business management. Letters of general interest will be published, but the writer's name will not be revealed without his permission.

HORACE HAMPTON POINTS THE WAY TO PRESCRIPTION PROFITS.

Horace Hampton, progressive Centertown druggist, was entertaining his classmate, Lloyd Hamel, of Cleartown. Although Cleartown was only 30 miles from Centertown, Mr. Hampton rarely saw his college friend. Mr. Hamel's store hadn't grown to any size—he employed only a qualified assistant in addition to himself—and the full holidays he took were rare indeed.

That was why Mr. Hampton was especially surprised to see him come walking into the store one warm morning in September.

"Well, stranger, this is a real surprise. What brings you out so early? Come on back and sit down."

Seated in the corner of the prescription room which Horace Hampton called his "office," it soon developed that the object of Mr. Hamel's visit was more than a purely social call. Lloyd Hamel had come at last to recognize that much about the conduct of a successful drug store could be learned from outside observation. His years of close confinement to the store, he finally realized, had narrowed his vision. He needed to renew his hopes and courage with a fresh viewpoint. What was more natural than that on the first day of what he called his "business vacation" he should call upon his old friend and college chum, Horace Hampton, proprietor of two large and successful stores in Centertown? Surely, Horace Hampton with his long and profitable experience in the conduct of drug stores could and would give him some ideas which he could make use of to put his own store on a more prosperous basis.

Of course Horace Hampton could and would. One characteristic of successful business men is that they are prodigal almost to a fault in their willingness to give others the benefit of their ideas and successful experience.

"What put my first store on its feet," began Horace Hampton, "was its prescription business. After all, the one thing that distinguishes a drug store from all other retail stores is this professional service which it and it alone is equipped for and capable of rendering.

"However, there isn't much comfort in prescriptions or any other kind of business if it can't be handled at a profit. Of course there are lots of public services that a drug store has to and is glad to render for its patrons and prospective patrons

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but, after all, the thing that determines whether or not a store is going to remain long in business is the amount of profitable business it can do.

"The first thing I had to do, therefore, was to determine whether or not such a business, if I did obtain it, would be profitable."

"How many prescriptions do you suppose you average a day, Lloyd?"

"I'm ashamed to tell you, Horace. I doubt if I average more than two a day. When I have filled four in a day that has been a big day with me."

"Think what that means, Lloyd. You and your assistant are working there in the store day in and day out for what? To fill two to four prescriptions."

"We sell lots of other merchandise. Of course I wouldn't have lasted three months if I had had to depend all these years on prescriptions alone."

"True enough. I don't know what you are drawing from the store as salary but I presume you pay your assistant the going rate of wages. I don't need to tell you that those salaries are considerably above those which salespeople in other retail stores receive. Why are they higher; why should they be higher? Simply because you and your assistant are equipped and ready to render a professional service which, under conditions as they are now, you are called upon to use only in the compounding of two to four prescriptions a day! Instead, what you and your assistant are doing is selling tooth paste, soap, hair nets, soda-fountain drinks and so on. This is perfectly legitimate, to be sure, but your professional training certainly isn't necessary to make such sales.

"Across the street in the five and ten they take green country girls and pay them $8 to $12 a week to sell just the things that you sell mostly—tooth paste, soap, hair nets, soda fountain drinks and so on. Is it any wonder that the average five and ten is far more prosperous than your drug store?"

"People would rather buy such things in a drug store, Horace," objected Hamel.

"Of course they would. Everybody likes the personal attention of the manager. But you aren't going to be able to give it to them very long if you go bankrupt from a lack of profitable business."

"Granting that all you say is true, Horace, how is a larger prescription business going to help things?"

"You and your assistant I suppose keep the store open 15 or 16 hours a day?"

"That's right."

"Now, doing the volume of business that you do, it's true, isn't it, that you and your assistant aren't on your feet waiting on customers every minute of those 15 or 16 hours?"

"No, indeed, there's an hour in the late afternoon and another in the early evening when we are rather busy but the rest of the time things are pretty quiet. We have a couple of comfortable chairs in the prescription room and, needless to say, we both are able to give pretty close attention to the morning and evening papers."

"In other words, at practically any hour of the day you both have plenty of time available in which to take care of prescriptions. That is to say, you could fill every day ten or fifteen times as many prescriptions as you do now with no increase whatsoever in your operating expenses. You and your man have to be there; you have the training and experience to fill prescriptions. The only additional cost would be the cost of the supplies and materials that you would use.

"You know and I know that the cost of materials and supplies used in the average prescription will run from 10 to 50 per cent of the price you receive for the prescription. If there is no extra expense in compounding it, that gross margin on these additional prescriptions is just so much additional velvet for you."

"I'm not so sure about that last figuring of yours, Horace. I read somewhere about a druggist who sold cigars at cost because he had to carry them anyway and therefore they didn't add anything to his overhead. Then he started selling bulk ice cream the same way for the same reason. If you start that way where are you going to stop? Something has got to carry the overhead."

"All right, we'll figure it your way, if you want to. I simply was trying to show you that you and your assistant were in the store with idle time which, if the prescriptions were obtained, could be turned into highly profitable work.

"Suppose we do charge the proportionate share of the overhead to these additional prescriptions. Prescriptions naturally carry a larger gross margin on account of the professional services involved. What is going to be the effect on the average gross margin of your whole business if you bring in a large volume of this high margin prescription business. Your operating expenses, as I explained, don't increase so your net profits are bound to go up."

"That's a pretty rosy picture you paint, Horace."

"Don't go too fast. I've told you, so far, only a third of the story. Up to now I've tried to show you how profitable a worthwhile volume of prescriptions can be in a small store. The next step is to determine how much prescription business there is to be had in Cleartown, and then last, how to go about getting this business.

"Let's step out and get a bite to eat now and then after lunch we'll go into the last two matters."

(To be continued)

PHARMACISTS IN THE NAVY.

January 1929, number of the *Hospital Corps Quarterly*, published for the information of the Hospital Corps of the U. S. Navy contains a number of interesting articles by pharmacists. The first one is on "Naval Hygienic and Sanitary Questions," by W. H. McWilliams, Chief Pharmacist of the U. S. Navy. Another is by R. W. Gray, Pharmacist's Mate, First Class, U. S. Navy, on "Dark-Field Examination for Treponema Pallidum;" and a comprehensive contribution dealing with Notes on Photography is by H. F. A. Long Pharmacist's Mate, Second Class, U. S. Navy. Another article deals with Practical Suggestions, by Henry Scheidegger, Chief Pharmacist's Mate, U. S. Navy.

On November 1, 1928, sixty names of pharmacists' mates, first-class, were on the waiting list for Chief Pharmacist's Mate, and the following promotions to Chief Pharmacist's Mate acting appointment have been made: E. C. Beaulac, T. A. Boardman, D. H. Diamond, S. R. Giles, J. T. Havlicheck, I. L. Haim, R. J. Lyons, F. H. McGuire, F. O. Tibbetts, Q. C. Tucker, O. L. Youngblood. Promotions to Pharmacist's Mate, First Class, list the following: R. L. Bodiford, Joe Gavin, M. H. Harford, D. W. Lacy, Benjamin Osti.

THE DEPARTMENT OF THE NATIONAL ASSOCIATION OF BOARDS OF PHARMACY

H. M. Lerou, President, Norwich, Conn. J. W. Gayle, Treasurer, Frankfort, Ky. M. N. Ford, Chairman of Executive Committee, Columbus, Ohio. H. C. Christensen, Secretary, 130 N. Wells St., Chicago, Ill.

ACTIVE MEMBER STATES.

Alabama	Indiana	Montana	Rhode Island
Alaska	Iowa	Nebraska	South Carolina
Arizona	Kansas	Nevada	South Dakota
Arkansas	Kentucky	New Hampshire	Tennessee
Colorado	Louisiana	New Jersey	Texas
Connecticut	Maine	New Mexico	Utah
Delaware	Maryland	North Carolina	Vermont
D. of Columbia	Massachusetts	North Dakota	Virginia
Florida	Michigan	Ohio	Washington
Georgia	Minnesota	Oklahoma	West Virginia
Idaho	Mississippi	Oregon	Wisconsin
Illinois	Missouri	Pennsylvania	Wyoming

DISTRICT NEWS.

A joint meeting of representatives of the colleges of pharmacy and state boards of pharmacy of N. A. B. P. District 6, including Arkansas, Kansas, Oklahoma, Texas and Missouri was held in the Plaza Hotel, San Antonio, Texas, January 18 and 19, 1929.

C. M. Anderson, N. A. B. P. vice-president, presided and H. S. Shackleford of the Oklahoma Board acted as secretary. Dr. Rufus A. Lyman, dean of the University of Nebraska College of Pharmacy at Lincoln, was guest of honor. The Texas, Kansas and Oklahoma boards were represented and Dean D. B. R. Johnson of the University of Oklahoma represented the colleges of the district.

At the Thursday afternoon session, Dean Johnson explained the type of questions used by the colleges in their final examinations. This topic had been suggested by the national secretary, H. C. Christensen, who was unable to be present at the meeting, as it was felt in several districts last year that board members would profit in their own examination work by information as to how the student is examined in the colleges on what he has been taught.

Walter H. Cousins of the Texas Board and Joe Demain of the Kansas Board then reported on the college prerequisite legislation pending in both states. Each expressed confidence in the enactment of this provision.

The following served on the Resolutions Committee: W. H. Cousins, Joe Demain and D. B. R. Johnson.

The Friday morning session was spent in the discussion of nine questions or topics which had been suggested for the meeting.

Dr. Lyman spoke on "What subjects should be added in pharmacy for the four-year course?"

Dean Johnson spoke on a related topic, "If no subjects are added, which ones now given should be increased?"

Dean Gidley of the University of Texas School of Pharmacy was unable to

attend the meeting, but had submitted a written paper on "To what extent shall commercial pharmacy be taught in the three-year pharmacy courses?" He favored the teaching of fundamental principles, for example of salesmanship, pharmaceutical jurisprudence, accounting, advertising, etc., as something to guide the student after he becomes a pharmacist. He did not regard "model drug store" work as sufficiently comprehensive. All commercial subjects should be taught on a university plane. Those pharmacy schools connected with state universities or colleges with commerce departments have the advantage of being able to use specialists in the field of advertising, accounting, etc.

Dean Johnson then spoke on the advantages and disadvantages of apprenticeship, both in the prescription department and the front-store work. He pointed out that the opportunity for pharmaceutical training in a drug store is not what it used to be. For that reason, the colleges must make up this deficiency by an increase in the work given in operative pharmacy. Among the advantages, he mentioned the chance for teaching an attitude of service and courtesy, in even such small details as wrapping packages properly.

Paul Moomaw of the Oklahoma Board of Pharmacy expressed his views on "How much should the identification count on examination for registration?" As far as the N. A. B. P. is concerned, it might be mentioned here that identification is not a recognized or required subject. Some boards still use it as a part of the oral quiz or practical work and to that extent it may often be used to advantage. It is, however, generally conceded that "identification" is not of sufficient importance to warrant its being given as a separate branch or subject.

Two subjects, closely related, "What changes are necessary in the U. S. P.?" and "What plans should be made concerning the next convention for the revision of the U. S. P.?" were then discussed by Dean Johnson. A resolution resulted and is given at the conclusion of this report.

E. M. Joseph of the Texas Board spoke for the boards on "What part should the school play in obtaining laws for the betterment of the profession of pharmacy?"

Dean Gidley had submitted a written paper on the same subject, in which he expressed the opinion that the school should not be the aggressive element in this work. Suggested changes, he felt, should originate among the progressive, active pharmacists of high standing in the state who have the practical viewpoint. This plan had been followed in the Texas campaign for a college prerequisite and culminated in success. The school, he felt, should be militant in its program for the betterment of pharmacy but its function should be advisory.

Mac Childs of the Kansas Board talked on the topic, "Shall we from District 6 present a resolution for the classification of the schools of pharmacy by the A. A. C. P. or demand an outside source?" The resulting resolution is given later.

While much of the discussion at district meetings does not crystallize in definite action or adopted policies, yet the discussion of the viewpoint of the colleges and that of the boards results in mutual understanding and help.

RECOMMENDATIONS.

1. That all pharmaceutical bodies, chemical and medical groups that are incorporated be urged to send either representatives or proxy to Washington, in 1930, for the U. S. P. Revision Convention.

2. That investigation and classification of schools of pharmacy be conducted by an outside agency with pharmaceutical men on the committees.

A resolution of thanks was extended to the San Antonio Retail Druggists' Association for the splendid entertainment furnished the District No. 6 delegates.

Some effort is also being made to bring about a joint meeting of the boards of pharmacy and representatives of the colleges of pharmacy of the Rocky Mountain states (District 8—Colorado, Utah, Idaho, Montana, New Mexico and Wyoming) some time within the next two or three months. Salt Lake City is being considered most favorably for such a meeting, and President Joseph P. Murray, of the Colorado board and vice-president of the National Association of Boards of Pharmacy for the district, is collaborating with Dean Leonard of the college of pharmacy of the University of Idaho, at Pocatello, in arranging for the meeting.

The boards of pharmacy and colleges of pharmacy of New York, New Jersey, Pennsylvania, Delaware, Maryland and the District of Columbia, comprising District No. 2 of the National Association of Boards of Pharmacy, held a two days' conference at the Chelsea Hotel, Atlantic City, on March 11th and 12th. Dean J. W. Sturmer of the Philadelphia College of Pharmacy and Lloyd N. Richardson of the Maryland Board, N. A. B. P. vice-president, were in charge of the meeting. Special stress was given to the technique of educational processes and the most approved methods of conducting examinations. The last session was devoted to three interesting papers, one by John C. Krantz, Jr. on "The More Recent Research Developments in Pharmacy," another by John R. Minehart on "Bacteriology—Public Health and Sanitation," and a third by Robert L. Swain on "Educational Progress and Board of Pharmacy Members." Detailed report will be published later.

PRESIDENT JONES ADDRESSES CHICAGO BRANCH.

Dr. David F. Jones, President of the AMERICAN PHARMACEUTICAL ASSOCIATION was the guest of honor at the meeting of the Chicago Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION at a dinner held at the Hotel La Salle on February 22, 1929. He had been asked to tell his listeners how he had built a successful pharmacy in South Dakota and the story he told was as interesting and thrilling as fiction.

The first essential he gave was confidence—belief in your own success. It did take that to order a large supply of diphtheria antitoxin when not a doctor in town had ever used it, merely on the strength of newspaper reports showing an epidemic sweeping across neighboring states. But it saved many lives and won a vital place in the community for the pharmacist who had the vision to do it. His interest in chemistry and the manufacture of preparations and chemicals for his own supply when the market could not be reached in time of necessity during the days of the covered wagon, won for him recognition as a chemist all over the state. A great part of Dr. Jones' time even now is occupied with work for the state. Anyone who doubts whether professional pharmacy pays would have been convinced after hearing President Jones.

The N. A. B. P. office greatly appreciated and enjoyed the honor of a sociable visit with President Jones. He is an honorary member of the N. A. B. P. by virtue of his having been a member of the South Dakota Board of Pharmacy for many years.

LEGISLATIVE NEWS.

Pharmacy Corps Bill.—Splendid progress is being made. A hearing was granted before the Committee on Military Affairs of the House of Representatives on February 20, 1929. The chairman of the Pharmacy Corps Bill Committee, A. L. I. Winne (Virginia Board); S. L. Hilton, of Washington, D. C., for the AMERICAN PHARMACEUTICAL ASSOCIATION; Dr. A. G. DuMez, of Baltimore, President of the American Association of Colleges of Pharmacy, Robert L. Swain (Maryland Board) representing the National Association of Boards of Pharmacy and James F. Finneran, of Boston, Mass., for the National Association of Retail Druggists, spoke before the House Committee and made a strong, and, it is hoped, effective appeal. Besides the organizations named, the American Drug Manufacturers' Association, the American Pharmaceutical Manufacturers' Association, National Wholesale Druggists' Association, the Federal Wholesale Druggists' Association, the Proprietary Association and the Conference of Pharmaceutical Secretaries were represented at the meeting or by resolution urged the passage of the bill. The fact that the soldiers in the army are not given the pharmaceutical service and resulting protection of health which the civilian enjoys was one of the strongest arguments in favor of the bill.

California.—The February 19th information letter of W. Bruce Philip, secretary of the Alameda County Pharmaceutical Association, gives considerable information as to the legislative activity of California. Briefly summarized, the following bills are pending: Registration of all drug stores as a means of checking against illegitimate stores; elimination from the pharmacy law of certain provisions, now enforced under the Pure Food and Drug Act; permitting the sale of "economic" poisons in lots of four pounds or more, and confining their sale in lesser quantities to a registered pharmacist and necessary controls in the interest of public health; a veronal bill which needs considerable revision in the opinion of Mr. Philip.

Idaho.—Fred E. Lukens, Commissioner of Law Enforcement, reports an amendment to the pharmacy law which has been presented to the legislature making certain provisions with regard to the re-instatement of canceled or lapsed licenses.

Illinois.—A narcotic law has recently been introduced in the legislature, designated as Senate Bill No. 102, and more commonly known as the Barbour bill.

Two distinct subjects enforced by two different state departments are combined into one bill, which alone would probably be held unconstitutional if passed. The first places a great many unnecessary red tape restrictions on the sale of narcotics and is to be enforced by the Department of Public Health. The more objectionable features are: (1) requiring the person filling prescription to write his name across the face of the prescription; (2) requiring a poison label in addition to the physician's label; (3) inclusion of "cannabis sativa" and "cannabis indica" in the regulatory list. The second part of the bill makes provision for establishment of a state narcotic hospital and commitment of addicts therein, under the supervision of the Department of Public Welfare.

Physicians, pharmacists and medical and pharmaceutical associations in the state are fighting the enactment of the bill. A strong editorial in the *Chicago Tribune* of Feb. 24, 1929, comments as follows:

"The American Medical Association and the Illinois Medical Society have joined in attacking the Barbour narcotic bill now before the state legislature. The bill is intended to supplement and is more severe than the federal narcotic acts. It provides that upon complaint of a policeman or private citizen, suspected addicts are to be brought before a judge. Upon the testimony of two reputable physicians that the prisoner is a drug addict, he must be confined for from eight months to two years and may be kept under surveillance and required to report periodically for the rest of his life.

"The framers of the bill, in the opinion of the medical profession, do not understand the problems they are attempting to deal with. They do not understand drugs, drug addicts or the

means of preventing and curing drug addiction. . . . . The measure is understood to have the support of Capt. Richmond P. Hobson, president of the International Narcotic Educational Association and secretary of the World Conference on Narcotic Education. Capt. Hobson was a naval officer who went into the prohibition business and left the prohibition business to go into the drug evil profession. The pattern of his thinking is revealed in the name of his society which stresses the word 'education' but supports laws which, in effect, treat the addict as a criminal. Captain Hobson is ill qualified for the task of law making.

"The Barbour bill is a racketeering measure. Its enactment would be followed by demands for an enforcement division with a pay roll at public expense. The bill is opposed by the men who are in a position to know most about the evil it is intended to correct and it is favored by men who will be helped to hold their jobs if it is passed. A vote against this bill may be characterized by Captain Hobson and his followers as a vote in favor of dope, but only a spineless or a stupid legislator would be stampeded by such an argument."

Similar bills may be introduced in other states this legislative session, and for that reason the bill is reviewed here.

Kansas.—Secretary King, of the Kansas Board, reports that the amendment to the pharmacy law providing for college of pharmacy graduation for entrance to examination for pharmacist, etc., was passed by the House without opposition on the 12th. Similar action is expected by the Senate shortly.

Oklahoma.—A pharmacy bill was introduced in the House on February 12th and the latest report was that it was ready for the third reading. Those in charge of the bill are very optimistic about its passage. It provides that all drug stores must be owned by a registered pharmacist or, else, have in charge a registered pharmacist; provision is made for an inspector in the field to enforce the pharmacy law, as well as funds to carry on the work; a drug store is clearly defined and all signs, etc., are limited to places which are really pharmacies.

Pennsylvania.—Three bills are pending before the Pennsylvania legislature which are of special interest to druggists: One amending the Pharmacy Act regulating the sale of commonly used household drugs; the second, amending the Drug Act regarding the standardization of U. S. P. and N. F. preparations; the third, amending the Pharmacy Act regulating the compounding and dispensing of drugs, medicines and poisons.

Texas.—Chairman W. H. Whisenant, of the Legislative Committee, reports that the pharmacy law has passed both houses and is in the hands of a joint committee,[1] owing to a slight difference in the two bills as passed by the House and the Senate. The bill includes the model prerequisite and reciprocity section and Texas will require college graduation for entrance to examination in the very near future. To those who hesitate about presenting a college prerequisite bill let it be said in encouragement that there was no objection whatsoever to that particular part of the law.

STATE BOARD NEWS.

Alabama.—The board of pharmacy met in Birmingham on February 13th and 14th and examined seven candidates. Six were successful.

The next meeting is scheduled for June 10th and 11th at Huntsville, where the state pharmaceutical association is meeting at the same time.

J. F. Spraman, state inspector, has recently inspected over 500 stores, obtaining five convictions with more to follow later.

Reciprocal registration was granted during February to Aubin B. Fokes, of Georgia.

Alaska.—Reciprocal registration was granted on February 4th to Melvin C. Debban, of Oregon.

Arizona.—The next examination meeting will be held on April 10th and 11th at Phoenix. For further information and application blanks, write Arthur G. Hulett, secretary, Phoenix, Ariz.

Colorado.—The next Denver examination will probably be held in May, and it is likely that there will be one at Grand Junction some time in April, or possibly just preceding Easter, which comes this year on March 31st.

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[1] This committee has come to an agreement and the Governor's signature is expected very soon.—*Editor.*

Reciprocal registration has been granted recently to the following: Geo. D. Houchen, Paul W. Smith and Homer E. Welch, all of Missouri; Francis M. Gamble, of Ohio; B. F. Knisely, of Oklahoma; Royce M. Powell, of Tennessee; Floyd A. Johnson, of Iowa; Russell E. Brown, of Arizona; Herman Murdock, of West Virginia; Olindo di Napoli, of Connecticut; Mary Gladys Lusk, of Wyoming; William W. Weitgenant, of New Mexico; Herbert A. Stewart, of Michigan and W. R. Waxter, of Illinois.

Iowa.—Reciprocal registration was granted on February 13th to Franklin R. Kuebler, of Nebraska and Marvin A. Edison, of Wisconsin.

Kansas.—The Kansas Board held an examination in Wichita on February 6th and 7th with seventy-five candidates present. Report of results will not be available until later.

Everybody reports a good time at the dinner given to the board of pharmacy, at Macksville, by Joe Demain, retiring member of the board.

Maryland.—Two West Virginia registrants, Wilbur E. Crofton and Edward C. Shepherd, were granted reciprocal registration recently.

Massachusetts.—Reciprocal registrations have been reported as follows: Joseph T. Daley, of Connecticut; Theo. N. Shorey, Ernest L. Foss, Clayton C. Steeves, James S. Kirby, Jr., and Edmund K. Daley, all of Maine; Edmund F. Sullivan, of Rhode Island; Frank A. Dines and V. Malcolm Laitinen, of Vermont.

Michigan.—Reciprocity has been extended to Nelson J. Fenning, of Florida; Brewer C. Sawyer and Owen Williams, of Illinois; Silas J. Tichenor and Mrs. Elnora B. Watley, of Kentucky; V. L. Jirasek, Ernest D. Gorsuch and William G. Willoughby, of Ohio; John B. Harrell, Jr., of Oklahoma; Abraham Reiner and Mrs. Florence H. Guth, of Pennsylvania; Grace R. Whitehead, of South Dakota.

Mississippi.—Cornelius K. Herlihy, of Louisiana, was registered by reciprocity during February.

Missouri.—As a result of the recent examination held at Jefferson City on January 21st and 22nd, 23 licenses have been issued as registered pharmacist and 26 as assistant pharmacist. Two Arkansas registrants, James W. Mitchell and Charles D. Earl, were recently granted reciprocal registration.

New Hampshire.—Reciprocal registration was granted recently to Raymond H. Pressey, of Indiana; Victor C. Morris, of Maine; and Frank W. Ring, of Massachusetts.

North Carolina.—James B. Spiggle, of Virginia, was granted registration by reciprocity recently.

Oklahoma.—Nineteen out of twenty-three taking the board examination on February 4th and 5th were granted certificates as licensed pharmacists.

Oregon.—Reciprocal registration has been granted recently to Watson O. Spencer, of Colorado; Roger H. Keane and Omar J. Adkinson, of Washington.

Pennsylvania.—At the January meeting, 84 appeared for examination as registered pharmacist and 40 were successful. For the assistant examination, 176 appeared and 56 were successful.

Rhode Island.—Franklin Jackson of Florida was granted reciprocal registration recently.

Tennessee.—Clarence C. Woodburn, of Kentucky was granted a reciprocal license in Tennessee recently.

Texas.—Reciprocal registration was recently granted to the following: Louie K. Dickson and Hugh G. McCrary, of Arkansas; William D. Thorn, of District of Columbia; Albin J. DeBlieux and Johnnie Grado, Jr., of Louisiana and James S. Harrison, of Oklahoma.

Virginia.—The annual meeting of the board will be held April 26th. The next examination is scheduled for June 4th and 5th.

Wyoming.—Reciprocal registration has been granted to William H. Glasgow, of Montana and E. Wayne Alred, of Utah.

FIXED GLASS STOPPERS.*

Glass stoppers which have become fixed can easily be loosened without heat by allowing a few drops of the following solution to soak in between the neck of the bottle and the stopper:

Chloral hydrate	10 Gm.
Glycerin	5 Gm.
Water	5 Gm.
Hydrochloric acid (25 per cent).	

* W. Kinzel (*Chem.-Ztg.* (1926), 50, 383). (This works well in practice.—Abstractor.) Through *The Pharm. Jour. and Pharm.*, Feb. 9.

THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C. B. JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A. A. C. P., EDITOR OF THIS DEPARTMENT.

PREREQUISITE LEGISLATION.

A Statement Prepared by the Joint Committee on Prerequisite Legislation of the National Association Boards of Pharmacy, the American Association of Colleges of Pharmacy and the American Pharmaceutical Association.

I. INTRODUCTORY.

The dictionary informs us that "prerequisite" means "something previously required or necessary for an end proposed." In pharmacy the term represents a more or less definite preliminary and professional education required of the candidate for the pharmacist's license. In this sense, the meaning of "prerequisite" is two-fold; it includes not only the professional education in a college of pharmacy but also the high school preparation which necessarily precedes it.

II. HISTORY AND PRESENT STATUS.

While the subject of requiring college graduation has been under discussion for many years, it has been only during the last twenty-five years that sentiment crystallized to such an extent as to bring about the enactment of "prerequisite" laws. The first law of the kind went into effect in New York in 1905 and its operation was watched with the greatest interest by the pharmaceutical profession of the country. Pennsylvania followed soon after; then Rhode Island fell into line and, then, North Dakota and Ohio joined the ranks of "Prerequisite States."

The beneficial effects of prerequisite laws in these states were so apparent that prerequisite legislation spread very rapidly and to-day 36 states and the District of Columbia have prerequisite laws or have secured the same effect by Board of Pharmacy rulings. The territory of Porto Rico and the Republic of Cuba also have prerequisite laws. Only the following states do not yet have prerequisite laws: Arizona, Kansas, Maine, Massachusetts, Missouri, Nevada, New Hampshire, New Mexico, South Dakota, Tennessee, Vermont, Wyoming.

Prerequisite legislation is now far beyond the experimental stage and has proved its worth in every case. Those who feared that such legislation, if enacted in their states, would bring about undesirable conditions have learned by experience that their fears were unfounded. If the pharmacists of any state were dissatisfied with the results of prerequisite legislation they would be expected to express this sentiment and to endeavor to repeal the legislation. With a majority of the states operating under prerequisite legislation for several years, all efforts to modify the laws have been in the direction of strengthening them rather than toward repeal.

It is worthy of note that where a referendum vote of the pharmacists of the state has been taken to secure an expression on prerequisite legislation, the result has been overwhelmingly favorable. In the Illinois referendum on the "Prerequisite" in 1912, the vote stood 965 for to 247 against. A referendum vote in Michi-

gan gave the same proportion, while a vote in Minnesota on the same issue gave a result of over eighty per cent of the votes in favor of the "Prerequisite."

Frequently the mistake has been made of including in one bill several amendments to the state's pharmacy law, each amendment having a different object and each entailing a certain amount of opposition; the opponents of these various amendments were thus able to combine and defeat the bill. Prerequisite amendments should be introduced as such, considered independently and accepted or rejected on their merits.

In some states, a number of pharmacists have opposed prerequisite legislation, some because the real purpose and importance of the legislation has not been fully explained to them and others because they feared an advance in the salary of drug clerks or that poor boys who could not afford the required high school and college education would be prevented from entering the profession of pharmacy. Experience in prerequisite states has shown that the benefits far outweigh the detriments, and based on this experience there is presented a statement of the arguments for and against prerequisite legislation with the hope that they will be given careful study by pharmacists, particularly in those states which have not as yet passed such laws.

It is recognized as important that legislation regulating the entry into and practice of pharmacy in the several states should be as nearly uniform as conditions will make advisable and this joint committee representing the National Association of Boards of Pharmacy, the American Association of Colleges of Pharmacy and the American Pharmaceutical Association urges that the enactment of prerequisite legislation in every state of the Union is now the most important step in this direction.

III. ARGUMENTS FOR PREREQUISITE LEGISLATION.

1.—The strongest argument for prerequisite legislation is that the public welfare demands it. Who would think of employing a physician who is not a college graduate? Yet the knowledge and skill of the trained physician may be nullified by entrusting his prescriptions to an ill-trained pharmacist. The laity are sufficiently informed regarding these dangers but the impression is general that when the state certifies to the training of the pharmacist by granting him a license, he, of course, must be a college-trained man. It is no answer to these arguments to say that self-prepared applicants must pass the same examination as the college men. We know that this does not imply equal proficiency. One has been prepared for life, the other in many instances for the examination merely. Education and practical experience are both necessary to make a capable and well-equipped pharmacist. One is no more necessary than the other. Pharmacy laws everywhere require practical experience. It is certainly as important to insist just as strongly on college training. Laws are for the benefit of the people and their welfare should be the first consideration.

2.—It is better for the pharmacist himself that he be a college graduate; in fact it is an injustice to the young man entering pharmacy not to require it. Both physicians and patrons will have more confidence in the college-trained man; he will have more confidence in himself. He will have a better appreciation of the value of accuracy and of the importance of seemingly small things. He will be better able to judge between a good medicine and a poor one. He will be capable

of determining the strength and purity of the medicines which he handles. He will understand the importance of having his preparations come up to the standard requirements and will know how to keep them from deteriorating.

3.—The study of pharmacy from a functional standpoint under the Commonwealth Fund and conducted by Dr. Charters and his able committee has proven conclusively that *Pharmacy is a profession* and that those who enter it should have a collegiate training. The men who made this study did not accept the opinion of the college professors nor of the retail pharmacists but made a careful study of the *actual* operation of the retail pharmacy and determined from these the training needed to efficiently perform these duties. Thousands of drug stores were studied to determine the knowledge necessary to efficiently compound prescriptions, to intelligently supply the needs of the customers and to coöperate with other health agencies in the all important business of promoting public health.

A study of this voluminous and searching report will convince any "Doubting Thomas" that prerequisite legislation is necessary for the protection of public health. A study of the report is issued under the title "Basic Material for a Pharmaceutical Curriculum" and can be secured from the McGraw-Hill Book Company of New York City. If there still be any retail pharmacists who seriously question the wisdom of prerequisite legislation, they owe it to themselves and to their profession to carefully study this report.

4.—The general establishment of the prerequisite of college training would add greatly to the professional standing of pharmacists. We all recognize the desirability of legislation that shall restrict the sale of drugs to those whose education and experience fit them for this responsibility. But it will be impossible to secure such legislation until we can demonstrate that the pharmacist is really an educated man. The only means of combating the dispensing evil is through the better training of pharmacists themselves. When pharmacists can show that they are trained specialists then they can successfully demand that compounding and dispensing be made their exclusive privilege.

5.—The prerequisite results in bringing into pharmacy a better educated and more desirable class of young men and women who are attracted by its professional character. It can scarcely be expected that high school graduates will enter a calling where they must start on the same footing as boys from the grades. They will naturally give preference to a vocation where their high school education counts for something.

6.—The present and future advancement of pharmacy requires a better professional preparation. The sciences underlying pharmacy, notably chemistry, physics, botany and physiology have developed with wonderful rapidity during the last decade. Medicine has also made great forward strides. Pharmacy must keep pace, or lose entirely its identity and its professional status.

7.—Prerequisite legislation is bound to come. It is now established in 35 states and the District of Columbia. Nowhere has any serious effort been made to repeal a prerequisite law. Pharmacists in other states are awakening to the fact that public sentiment will eventually demand such laws. Is it not better that pharmacists themselves should initiate laws affecting pharmacy rather than to leave this to outsiders? Let pharmacists have the honor of bringing about the new and better conditions.

IV. ARGUMENTS AGAINST PREREQUISITE LEGISLATION ANSWERED.

Answering now the arguments that have been advanced against the Prerequisite at various times; these are, in general:

1. *That the Prerequisite Would Impose a Hardship on Those Who Have Already Entered Pharmacy and Have Spent Some Years in Learning It.*—This argument is based on a misconception. All prerequisite laws have allowed a reasonable time for those already in pharmacy to qualify and in most instances this allowance has been exceptionally liberal.

2. *That It Would Greatly Increase the Wages of Drug Clerks.*—The operation of the Prerequisite Laws in these 35 states has not borne out this contention. There has been some increase in wages, comparable to the general increase in living cost, but this has not been proportionately more in New York with a prerequisite law than in Massachusetts without one.

3. *That It Would Subordinate the Boards of Pharmacy to the Colleges.*—Some opponents of the "Prerequisite" have made much fuss about the fearful results of turning over the Boards of Pharmacy to the colleges. Where prerequisite laws are in effect the Boards actually control the schools and check upon their work.

4. *That It Would Keep the "Poor Boy" Out of Pharmacy.*—At the present time when the opportunities for education are so numerous, there is no excuse for a poor boy being kept out, if he is made of the right sort of stuff. Not only are scholarships offered in several schools, but in practically all schools and, especially, those in the large cities; there are many opportunities for employment and self-support. Young men of reasonable "grit" and good health need not be kept from attending a school of pharmacy through lack of money.

5. *That College Courses Are Too Theoretical.*—If this is true the objector has in mind the wrong kind of college. Here is where the Boards of Pharmacy could exercise supervision. Laboratory instruction of the most practical kind has been greatly increased during recent years and college courses in pharmacy are better than ever before. Prerequisite laws do not repeal the requirement of practical experience but supplement it.

6. *That in Country Towns and Thinly-Settled Districts Professional Knowledge and Skill Are Seldom Required.*—True, possibly, but human life is as valuable in the country as in the city and the dangers of error just as great. Small communities are entitled to safe and efficient pharmaceutical service as much as are populous centers.

7. *That While "Prerequisite Legislation" Is Coming—the Time Is Not Yet Ripe for It in This State or Section.*—The experience of 35 states and the District of Columbia indicates that the pharmaceutical prerequisite is valuable alike to the public and to the pharmacist. Other medical branches are making rapid advances and in order to render the pharmaceutical service which such advances make necessary, pharmacy must keep pace and do so promptly. There is much discussion of the future of pharmacy and the question will be determined by the ability of the future pharmacist to give the professional service expected of him which in turn depends largely upon his education and practical training. It is essential that he have the best training possible and the time is ripe for "Prerequisite Legislation."

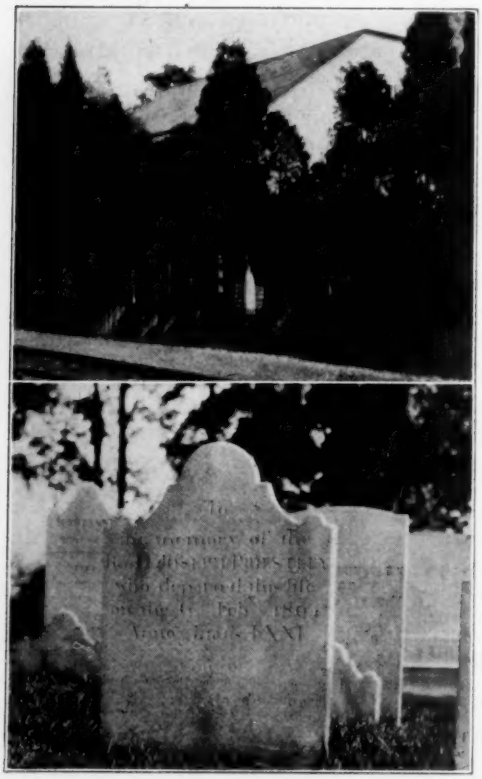
V. SUMMARY.

1.—Prerequisite legislation has had a fair test. It has been in operation in New York for twenty-three years and in other states for shorter periods. No serious efforts have been made to repeal these laws or regulations. The results have been satisfactory to the public and the pharmacists of those states. There has been no shortage of clerks nor have clerks' wages been unduly advanced. Entrance requirements to the colleges have been increased with the result that a better educated class of young men are entering pharmacy.

2.—Public welfare demands that the pharmacist be well trained. This training is not unduly expensive. Ambitious and energetic young men may be partly self-supporting while attending the schools of pharmacy. Quiz courses and courses by mail do not give the right training. Self-trained men are unlikely to be well trained.

3.—The present and future welfare of pharmacy demand better preparation both preliminary and professional on the part of the young men entering its ranks. The underlying sciences and the related medical branches are developing rapidly. Pharmacy must keep up or lose caste altogether.

4.—Prerequisite legislation has come in most states. It is better that pharmacists should direct it and adjust it to their conditions rather than to have it framed by outsiders. Properly drawn "Prerequisite Laws" will work no hardship on anyone.



Courtesy of George Decker, New York

Home of Joseph Priestley and grave at Northumberland, Pa.

Joseph Priestley died at Northumberland February 6, 1804. The American Chemical Society was organized after a visit to Priestley's grave; a large number of those in attendance were pharmacists, members of the AMERICAN PHARMACEUTICAL ASSOCIATION.

DRUGGISTS' RESEARCH BUREAU.

Bulletin No. 6 of the Druggists' Research Bureau presents the results of the first nation-wide census ever made of toilet stocks carried by retail druggists. Tables show the typical or usual number of brands of toilet goods carried, the varied assortments in the lines listed, the sizes and styles. Other tabulations are based on the ratio and proportions of the items carried in stores doing a varying amount of business, and in cities of different populations.

The Druggists' Research Bureau has established a direct mailing list for its research publications; retail druggists may have their names placed upon this list by the payment of $2.00—the office is 51 Maiden Lane, New York City.

COMMITTEE REPORTS

THE HEARING ON THE PHARMACY CORPS BILL.

Wednesday, February 20th, may be put down in American Pharmacy records as a day when the importance of pharmacy in Military Service was placed before Congress in a Hearing before the members of a Committee of Congress—the Committee on Military Affairs of the House of Representatives of the United States—H. R. 16278 by Congressman Clyde Kelly, and the same Bill was introduced in the Senate (No. 5406) by Senator Royal S. Copeland; both of these legislators are intensely interested.

The following organizations were represented at the meeting: The AMERICAN PHARMACEUTICAL ASSOCIATION, the National Association Boards of Pharmacy, the American Association Colleges of Pharmacy, the National Association of Retail Druggists, the American Drug Manufacturers' Association, the American Pharmaceutical Manufacturers' Association, National Wholesale Druggists' Association, the Federal Wholesale Druggists' Association, the Proprietary Association, the Conference of Pharmaceutical Secretaries, and by resolutions every National Association of the drug trade activities was represented.

A. L. I. Winne, Chairman of the Committee on Pharmacy Corps, gave an account of the action of the AMERICAN PHARMACEUTICAL ASSOCIATION at Portland, resulting in the formation of the Committee of which he is the Chairman. He referred to the correspondence with the Surgeon-General, which was made the subject of one of the first bulletins issued by the Committee and sent out to the pharmaceutical press. He stressed the need and reasons for a Pharmacy Corps and submitted a Brief in which the status of pharmacists in the U. S. Army is compared with that of other countries and pointed out the deficiencies to be corrected by the establishment of a Pharmacy Corps. (The Brief is appended.)

Chairman Winne then introduced Chairman S. L. Hilton of the Council of the AMERICAN PHARMACEUTICAL ASSOCIATION, who informed the members of the Committee relative to the importance of the pharmacist as a co-worker of the physician, an adviser relative to preparation of materia medica, of compounded medicines, of dosage, incompatibilities, etc. He referred to the fact that the numerous important branches in medicine made it necessary for the physician to depend on the pharmacist's knowledge, skill and care in the dispensing of medicines he prescribes and jointly with him safeguard the patient. He impressed the fact that nearly all medicines when given in large dosage or improperly dispensed are poisons and gave a number of examples from his own experience to explain his presentation. He also showed original orders which would have over-supplied narcotics, which would have been destructive, which provided for quantities far in excess of the intent of the prescriber and conducive to making narcotic addicts.

Questions from the members of the Committee came thick and fast and were met with ready answers. If it had not been for the memorial session held by Congress which required the attendance of the members the meeting would probably have lasted all afternoon. Permission was granted Chairman Hilton to extend his remarks. The orders were made part of the records.

President A. G. DuMez of the American Association of Colleges of Pharmacy had only five minutes to present the importance of pharmaceutical education and the advancement of requirements for pharmacists and extension courses in schools of pharmacy; he submitted a brief on the subject and the status of pharmaceutical education and the proceedings of the Association of which he is the president. He also referred to the U. S. Pharmacopœia revised largely by pharmacists and the National Formulary prepared by pharmacists.

Dr. R. L. Swain speaking for the National Association of Boards of Pharmacy called the attention of the Committee members to the fact that every state had enacted a pharmacy law, emphasizing thereby the dangers in the preparation and dispensing of medicines. He pointed out the watchful care of the Boards of Pharmacy so that the public may be protected and the advanced educational requirements in step with progress in medicine and pharmacy.

(It may be noted that a recent compilation of laws relating to Foods and Drugs, largely reference by titles and citations, covers 7000 pages, which bears testimony to the importance of pharmacy.)

Dr. Swain was permitted to extend his remarks.

James F. Finneran speaking for the N. A. R. D. referred to the number of enlisted men who had served in the hospitals during the war. He supplemented Chairman Hilton's references to dispensing pharmacy by pointing out the knowledge and training necessary to cope with incompatibilities which would destroy the intended purpose of the prescriber and endanger life. Mr. Finneran also was permitted to extend his remarks.

After the close of the Hearing it was readily discernible that a few who had questioned the need for a Pharmacy Corps in the Army had become convinced of the dangers in handling medicines by untrained men and women and, certainly, some of them realized that the soldiers should be given the same protection enjoyed by civilians.

Printed reports of the hearing will be distributed as soon as available.

BRIEF IN FAVOR OF ESTABLISHING A PHARMACEUTICAL CORPS IN THE MEDICAL DEPARTMENT OF THE UNITED STATES ARMY AS PROPOSED IN H. R. 16278.*

Honorable John M. Morin, Chairman,
and Members of the Committee on Military Affairs,
House of Representatives of the United States:

Gentlemen:

On behalf of the pharmaceutical organizations[1] represented at this hearing as favoring the legislation under consideration, and in the interest of those who constitute the Army of our country and of their families, this formal statement is presented.

Pharmacy a Necessary Profession.

The progress of medical service has necessitated specialization and the separation of medical practice into several branches—as medicine and surgery, dentistry, veterinary medicine, nursing and pharmacy. Those who practice either branch must be systematically and scientifically trained to discharge the particular service required of them in the interest of society.

The success of the other practitioners of medicine and the lives and welfare of their patients depend upon the faithful and capable performance of the work of the pharmacist, for unless drugs are properly selected, and unless the medicines are properly prepared and dispensed, their efforts are rendered ineffective and in many instances the health and even the lives of the patients are jeopardized.

American pharmacists hold a prominent position in the world development of their profession. The United States Pharmacopœia ranks as the peer of any national pharmacopœia. In the more recent revisions of this authority, the pharmacists have contributed very largely the chemistry, botany and pharmacognosy of the standards, as well as most of the formulas contained therein. The other legal authority for medicines, the National Formulary, has been prepared entirely by a committee of the AMERICAN PHARMACEUTICAL ASSOCIATION. It is inconceivable that the War Department should ignore this important branch of the medical profession and to-day has not commissioned in its service a single pharmacist to dispense medicines. Pharmacy is recognized as the right arm of medicine in civil life, and there is no reason why this cooperation should not be taken advantage of in the military service.

The Preparation and Dispensing of Medicines Regulated by State Pharmacy Laws.

The preparation and dispensing of potent remedial agents, whether in civil practice or in the military service, should be restricted entirely to those who have been especially educated and trained as compounders and dispensers of medicines. This principle is so thoroughly established that the States, and likewise the District of Columbia and our Insular possessions, in the exercise of their police power, have by legal enactment provided for boards of pharmacy to examine and license those to whom authority only is given to compound and dispense medicines.

The Army medical supplies necessarily include poisonous drugs and their preparations and the soldier is entitled to pharmaceutical service and protection equal to that which the States provide in civil life.

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* This brief is printed for ASSOCIATION record.

[1] See second paragraph of this report.

Prepared Medicines Not Adequate.

The statement has been made that "the pharmaceutical preparations of the Army, especially in time of war, are for the most part in tabloid form; the pharmacy is, therefore, a matter of dispensing rather than of compounding of preparations." If true, this indicates that pharmacy as practiced in the United States Army is very elemental indeed and that even the very basic ideas of professional pharmacy are ignored. Such service must necessarily be far from satisfactory or efficient or protective of the interests it is supposed to serve.

Tablets and similar preparations are for some purposes a convenient and useful dosage form, but for many purposes they are absolutely unfitted. Not infrequently, where prompt and reliable action is necessary, the conscientious physician is compelled to select some special form of medication. The most serious evil resulting from this "ready-made medicine" and tablet dosage is that too often the patient is made to fit the preparation on hand instead of a remedy being prescribed to fit the needs of the patient. There can be no question as to the superiority of the individual treatment over this method of "treatment *en bloc*." The proper method, and the ideal professional method, would be for the physician to diagnose each case, prescribe what that patient needs at that time and to have the medicines compounded and dispensed by a competent pharmacist. To do otherwise may be detrimental to the patient and to the medical service.

Efficiency of the Medical Department of the Army Demands an Adequate Pharmaceutical Service.

Each branch of medical activity requires specialized education and training, and the Medical Department of the Army should be so organized as to insure the employment of the personnel in that service for which they have been specially trained. Any other arrangement means inefficiency and lack of coördination.

The *Journal of the American Medical Association*, on June 16, 1917, editorially commented: "So far as official recognition of it is concerned, the science and art of pharmacy might not exist for the Army. To-day, as never before, victory in war goes to the Nation that most effectively conserves the health of its fighting men. The physician is now of such military importance that the medical profession will be called on to make no inconsiderable sacrifices. It will materially lighten the arduous duties and responsibilities of the physician to have in the Army trained pharmacists who will be able to give intelligent coöperation. But it is imposing too great a strain on the patriotism of those whose special knowledge is obviously a large asset to the Army, to expect them to enlist as privates without any recognition of their national worth. Pharmacists should be given a rank commensurate with their importance, first because it is but simple justice to the pharmacists themselves, secondly, because the usefulness of the medical corps will be greatly augmented and, lastly, and most important, because the efficiency of our Army demands it."

Resolution Adopted by House of Delegates of American Medical Association at 1917 Meeting in New York City.

"The pharmaceutical service in the Army is unsatisfactory because it is not on a modern basis; there is no pharmaceutical corps devoted to the prosecution of pharmaceutical duties; pharmacists are compelled to enlist as privates without the hope of promotion to commissioned rank as in the dental and veterinary corps. A professionally trained pharmaceutical corps could be made invaluable to the medical corps as assistants both in the field and in hospitals. We earnestly urge the War Department to establish by Congressional enactment a pharmaceutical corps with definite military standing and responsibilities."

Comparison of the Army Pharmaceutical Service of Foreign Nations with That of the United States.

In the Russo-Japanese War, the Japanese demonstrated the life-saving value of a scientific and systematically organized medical department, and the remarkable reduction of mortality from disease and wounds in the Japanese Army during that war attracted world-wide attention.

The pharmaceutical service in the German Army was completely reorganized in 1902. Since that date, the pharmacists in addition to performing purely pharmaceutical duties, have been given charge of the hygienic, chemical and research laboratories of the Army and each ranking officer in the Pharmaceutical Corps must have taken the special course in certain official laboratories and have obtained a diploma as a chemist qualified to examine foods.

Each army corps has an associated sanitary corps under the control of an apothecary officer who has charge of the pharmaceutical service and supplies and is the director of the laboratory connected with that corps. Each army corps has likewise a supply depot and a manufactory of supplies which furnishes the medicines and dressings for that army corps. The medicines kept on hand for the hospitals include nearly all the official pharmaceutical preparations.

The commander of the German Army Pharmaceutical Corps is the *Oberstabsapotheker* who is attached to the Medical Section of the Prussian Ministry of War and his rank is equal to that of a general of a brigade.

France has an organized Army Pharmaceutical Corps, the commander of which is called the Inspector and with rank as brigadier-general. The complete organization includes the titles of principal pharmacists, pharmacists, pharmacist-major and assistant pharmacist-majors and ranking as colonels, lieutenant-colonels, majors, captains and lieutenants. When the French peace army of 500,000 men was rapidly increased to 3,500,000 trained soldiers, the pharmaceutical corps was automatically increased from the pharmacists in reserve, many of whom had already held commissions and had experience in the sanitary corps.

In January 1915, over 1200 of the mobilized pharmacists who had the necessary experience and training in the service were commissioned as first-class assistant pharmacist-majors ranking as lieutenants. The pharmaceutical corps in France manufactures many of the army supplies and is charged with chemical examination of water, foods and army supplies, and a pharmacist of rank is attached to the Sanitary Council of each military district.

In Spain, as early as 1813, the Military Pharmacy Corps was promulgated. Despite the several changes and reorganizations of the Sanitary Corps that have taken place in that country since that date, the organization has been continued and its work made more comprehensive and beneficial. Its personnel comprises inspectors, subinspectors, pharmacist-majors, pharmacists of the first class and pharmacists of the second class and with commissioned rank from colonel to lieutenant.

In Japan, "the Army has a Sanitary Supply Department and the Director of this Department is equal in rank to a colonel, and wherever there is a barrack, it has a field hospital which has a Department of Pharmacy, and the Director of this pharmacy is equal in rank to a lieutenant-colonel. The rank of pharmacists in the Army is from a sub-Lieutenant to a Colonel."

The members of the Australian Pharmacy Corps are exclusively qualified pharmacists, enlisted under conditions similar to those which prevail with the other units of the A. M. C., physicians and veterinaries. The officers are: Senior Major, who ranks as staff officer of pharmacy service on the staff of the Director-General of the A. M. C.

Next in rank is Captain: the chief senior pharmacy officer of each state. Lieutenants are qualified pharmacists, head dispensers in general hospitals, base hospitals and forward casualty stations. Staff-Sergeant is the lowest rank of any member of the unit, and is held by all assistant dispensers, and men in charge of medical stores.

Senior Major, the officer commanding, is responsible for all medical supplies, and through him all recommendations for purchases must be made. Captain, as chief senior officer of the state, has charge and supervision of all medical stores and supplies for his state. Lieutenant has charge of medical supplies of hospitals, casualty stations and is chief dispenser for such institutions. Staff-Sergeant is assistant dispenser under command of the Lieutenant and A. M. C. Quartermaster.

All officers in the pharmacy department must be regularly qualified pharmacists, and draw pay according to rank, as in all other units.

The Medical Department of the United States Army has no Pharmaceutical Corps to render the pharmaceutical service provided for the armies of the nations referred to above.

The Soldier Is the Ultimate Concern of the Medical Department.

Those in the military service of the Nation and their families are entitled to the very best medical attention that the Government can procure. In the report of the Surgeon-General for the calendar year 1927 it is stated that the total number of patients among the military personnel treated in hospitals and dispensaries, from all causes, was 87,226. It is evident that an adequate and properly organized pharmaceutical service is essential to the treatment of such a large number of patients. The Surgeon-General is quoted as calling attention to "a distressing shortage"

of personnel in the Medical Department of the Army, which becomes "increasingly serious." The people of the United States will expect the Medical Department to adopt the most efficient methods for the conservation of the health and lives of our soldiers and of their families. The establishment of a Pharmacy Corps, as provided for in H. R. 16278, would meet one of the pressing needs of the organization of the Army. Congressman Clyde Kelly says:

"In the consideration of the proposal in Congress, it will be pertinent to remember that pharmacists must have special training in pharmacy. They must be graduates of a recognized pharmaceutical college, with some experience in retail and manufacturing pharmacy. They must have a special knowledge of medicinal drugs, chemicals, compounds, derivation, doses usual in the prescription uses of medicine and what are called the incompatibles. They must understand the methods of preparing mixtures and compounds of all kinds. They must know, for instance, how to prepare fluid and solid extracts, elixirs, sirups, pills, tablets, capsules, ampoules, etc. They must be able to supervise and direct such medicinally manufacturing work, to make proper inspection of material used and of the finished products and must be alert and dependable generally in their line of work."

A pharmacy corps organized as provided for in the measure before you will attract to the service this type of highly qualified pharmacist.

In our opinion, the present conditions surrounding the practice of pharmacy in the Army are highly unsatisfactory from the standpoint of the control and dispensing of drugs and medicines used in the maintenance and safeguarding of the health of the Army.

The Pharmaceutical Corps should be promptly organized to take up its various duties and to coördinate its work with that of the medical, dental, veterinary and nurse corps of the military service.

No doubt the experience of other nations will be duplicated in that the duties assigned to the pharmaceutical corps will rapidly increase and with such increase of duties the corps will grow in usefulness and importance. Eventually it may be placed in control of not only the providing, manufacturing and distributing of pharmaceutical and hospital supplies, but also, as in foreign countries, of the various hygienic, chemical, analytical and research laboratories of the Army.—February 20, 1929. Respectfully submitted,

A. L. I. WINNE, *Chairman, Committee on Pharmacy Corps.*

THE MINNESOTA PHARMACEUTICAL EDUCATIONAL CONFERENCE.*

BY FREDERICK J. WULLING.

The third annual meeting of the Minnesota Educational Conference was held at the College of Pharmacy on Monday, January 14th. So many inquiries concerning the nature and purpose of the Conference have reached me of late that I feel I should write this brief article, for the information of pharmacists of Minnesota as well as of elsewhere, although I have once before written about the Conference.

The Conference is a new organization having been established in the early Fall of 1927 for the purpose of carrying out the suggestions and offers of the National Association of Boards of Pharmacy and the American Association of Colleges of Pharmacy. These two national bodies represent the regulatory and functional, and the educational interests, respectively, of pharmaceutical development. These national associations were organized to meet the increasing and accelerating need of doing many things collectively and coöperatively, that could not be done otherwise. The N. A. B. P. membership is made up of the Boards of Pharmacy of the several states, and the A. A. C. P. is composed of the recognized colleges of pharmacy. Many things which the growth and development of pharmacy required to be done, and which the separate boards and the separate colleges could not do as individual organizations, the two national bodies now do very successfully. While each of the national associations works primarily in its own field, there are so many points at which they have contact with one another, and so many over-lappings of activities and interests, that it became necessary for them to work together on many points, and accordingly, they have held joint meetings for a number of years now during the periods of their annual meetings. The

* Read at the first midwinter meeting of the Northwestern Branch of the A. PH. A.

N. A. B. P. concerns itself primarily with the regulation of the practice of pharmacy and matters incident thereto; the A. A. C. P. with educational standards. Both of these activities have common points and interrelations. Both associations are working interestedly and succesfully in the general interest of pharmacy, and for a better status for pharmacy. Each association works collectively as an association and in this work it utilizes the coöperation of its membership units. Every individual board is working and coöperating in its own state with the N. A. B. P. and every college of pharmacy of standing is working with and supporting in its particular region the A. A. C. P. Every board and every college, therefore, is now much better off than formerly, because it has the active assistance and support of the National Association which enable it, as experience has shown, to do much more satisfactory work and to be much more influential than was formerly possible.

The relations of the N. A. B. P. and the A. A. C. P. have become from the beginning increasingly cordial and effective, and their collective upward influence upon pharmacy, as a whole, has become a matter of pride and satisfaction, even though their respective separate activities and also their united work have hardly begun. In their united endeavor to increase the effectiveness of the separate boards and colleges, the two National Associations, suggested two or three years ago to their respective memberships that pharmacy could be greatly benefited if the colleges and boards of the separate states would join and coöperate in regional or state matters, as the two national associations now coöperate in the wider and more national sense. Minnesota pharmacists were, I believe, the first to recognize the wisdom of the suggestion and to act upon the suggestion which was also voiced at the N. A. B. P. regional meeting in District No. 4 at St. Paul, February 9, 1927, which meeting adopted a resolution that "the Board of Pharmacy of Minnesota meet with a joint committee consisting of faculty members of the College of Pharmacy of the University of Minnesota, and the Educational Committee of the M. S. P. A." The way having been paved, I invited the State Board of Pharmacy, the Educational Committee of the M. S. P. A., and the Executive Faculty of the College of Pharmacy to meet at the College of Pharmacy in July 1927, for the purpose of not only holding a joint meeting, but for the establishing of a definite organization. The July meeting was a brief one and preliminary to the meeting held at the College of Pharmacy on Oct. 10th. At this meeting I suggested the organization of a permanent Conference rather than of an association, and that the structure of the Conference should consist of three major units: (1) the entire Board of Pharmacy, (2) the Education Committee of the M. S. P. A., and (3) the Executive Faculty of the College of Pharmacy. The meeting embodied this in a motion which was unanimously carried and thus the Minnesota Pharmaceutical Educational Conference was born.

At that first meeting of the Conference it was decided by unanimous votes that each of the composing units shall have one vote irrespective of the number of members making up the respective units; that the only officers of the Conference be a Chairman and a Secretary, and that the Chairman be the current Chairman of the M. S. P. A. Educational Committee, and the Secretary the current Secretary of the State Board of Pharmacy; that a record be spread upon the minutes embodying the general recognition of the existence in Minnesota for many years of amity, friendly coöperation and mutual good-will among all pharmaceutical bodies and interests; that the conference hold annual meetings in January during the week in which the Board of Pharmacy meets, and at other times as necessity may dictate, and that the meetings be held in the College of Pharmacy; that the Minnesota Pharmaceutical Eductional Conference was created not upon the initiative of its component units, but upon the suggestion of the N. A. B. P. and the A. A. C. P. that joint meetings of boards and faculties be held in each state for the purpose of pharmaceutical advancement.

Other actions and discussions related to board and faculty questions and how these could be improved through mutual and reciprocal helpfulness. It was also voted to give the fullest support to the now well recognized tendency to raise the board examinations to the standard of the college examinations as rapidly as the practical aspects of the general pharmaceutical situation, with which the boards have to contend, make it possible. The agreement was made and emphasized that it should be well understood that the organization is only a conference and that its motions and actions, for the present have no binding or legal effect upon the component units, but that nevertheless the utmost attention to and compliance with the actions of the Conference should be observed by the three units composing it.

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association, except with the consent of the Council." —Part of Chapter VI, Article VI of the By-Laws.

ARTICLE III of Chapter VII reads: "The objects and aims of local branches of this Association shall be the same as set forth in ARTICLE I of the Constitution of this body, *and the acts of local branches shall in no way commit or bind this Association, and can only serve as recommendations to it.* And no local branch shall enact any article of Constitution or By-Law to conflict with the Constitution or By-Laws of this Association."

ARTICLE IV of Chapter VII reads: "Each local branch having not less than 50 dues-paid members of the Association, holding not less than six meetings annually with an attendance of not less than 9 members at each meeting, and the proceedings of which shall have been submitted to the JOURNAL for publication, may elect one representative to the House of Delegates."

Reports of the meetings of the Local Branches shall be mailed to the Editor on the day following the meeting, if possible. Minutes should be typewritten, with wide spaces between the lines. Care should be taken to give proper names correctly and manuscript should be signed by the reporter.

BALTIMORE.

In assuming the presidency of the Baltimore Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION at the Hotel Emerson on Wednesday evening, February 27, 1929, President Frank L. Black arranged a rather unique program, which was presented as "Reminiscences" by several of the members.

James E. Hancock made comparisons between the reactions with reference to pharmaceutical problems which followed the Civil War, calling particular attention to the basic economic conditions attending both periods. He extolled the ideals and high character of the men who struggled to place pharmacy on a higher plane in the early 70's and 80's and appealed to the present-day pharmacists to consider pharmacy not only from the monetary standpoint, but also to enjoy one of life's greatest satisfactions, as he expressed it—"which is to know that when you have finished with the game, you have forced not only yourself but also the fellow members of your craft a little further ahead."

Louis Schulze recalled the men who were interested in the formation and extension of the Maryland Pharmaceutical Association, mentioning that he joined the ASSOCIATION at the sixth annual meeting. Mr. Schulze also recounted many pleasant incidents connected with the forty succeeding annual meetings, recalling with pleasure the large crowd of friends and visitors which assembled at an Ocean City meeting presumably to hear President McKinley, whereas President Robert S. McKinney of the Maryland Pharmaceutical Association was the scheduled speaker, the misunderstanding having been brought about by the misprinting of names in a Baltimore newspaper. He also recalled some of the incidents attending the passage of the first pharmacy laws of the State of Maryland.

E. G. Eberle presented several interesting books, including the Life of O. Henry, Reminiscences of Wilhelm Bodemann, Life of Lyman Spalding, the U. S. Pharmacopœia of 1830, History of the Lloyd Library, Life of Crawford W. Long, and a recently prepared scrapbook of interesting pharmacists and pharmaceutical events, in connection with his reminiscences of general pharmacy. He told of his early experiences in connection with the preparation of aconite plaster; the pleasurable duty of carrying the basket as his preceptor purchased drugs in the local market, the dismay of one of his associates who received a showerbath of lamp black intended for his friendly enemy, and the unique side-line established by a pharmacist in connection with the restoration of features of certain prize-fighters.

Dr. John C. Krantz, Jr., Dr. R. L. Swain, Ex-President L. M. Kantner and Charles E. McCormick recounted the experiences and the ideals of later pharmacists and pharmaceutical educators.

Hugh B. McNally, soloist, and S. Molinari, pianist, of the School of Pharmacy of the University of Maryland, rendered the musical program. President Black was congratulated upon the success of the first meeting, and upon the outlook for a very successful year for the Baltimore Branch.—B. OLIVE COLE, *Secretary-Treasurer.*

CHICAGO.

The Chicago Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION held a most successful and enjoyable meeting February 22, 1929. It was the 180th meeting of the Branch, and was preceded by a dinner served in the East Room of the Hotel La Salle.

President J. H. Lindahl called the meeting to order and called on Mr. Wallace, who spoke briefly on the need of a course in merchandising in the pharmacy schools in order for the independent pharmacist to compete with the chain store. S. C. Henry expressed his opinion that professional pharmacy will continue to grow, and introduced the speaker of the evening, President D. F. Jones, of the A. PH. A., who has been unusually successful as a pharmacist.

President Jones gave a most interesting and helpful talk on "Building a Successful Pharmacy." He related his experiences in establishing his drug store and increasing his business. From his observations it is unwise to attempt to compete with department stores in various side lines or with restaurants by operating lunch counters and soda fountains. Mr. Jones offered this suggestion: Follow the line of least resistance, or in other words, do the things that your competitor does not do.

Service, coöperation and the determination to succeed are essential to the building of a successful pharmacy. He told how he manufactured trichloracetic acid for a dentist when none was obtainable. A complete line of biologicals is maintained, and as a result of working with the physician this store sells over 90% of the biologicals in and about the city of Watertown.

A number of years ago Mr. Jones was called upon to assay some pharmaceutical products and appear in court as an expert witness in a law suit. This field of work continues to grow and has proved very remunerative.

By upholding the standard of service to the community, and fair representation of goods, the store has won an enviable reputation throughout the northwest. Only one side line is carried and this is a line of books (high class books) which have brought very profitable returns, although Mr. Jones would not especially recommend this as a side line.

Seventy-five per cent of the sales are from prescriptions, which is quite unusual in a town of 12,000. Figuring profits on sales, 60% gross profit is expected. He recommended buying in larger quantities if you can use the goods in a year, cutting the cost perhaps 40–50 %, which is better than a time certificate in the bank.

Another feature rather unique for a pharmacy is the manufacture of compressed tablets and ampuls. An enormous business has been developed and has proved to yield a better profit than the usual side lines.

Mr. Jones then told of the plans for the convention of the A. PH. A. at Rapid City. He told of the weirdness and fascination of the Bad Lands and Black Hills of South Dakota.

Following the excellent talk by President Jones, Robert J. Ruth told of his trip throughout the country and conveyed a spirit of optimism and expectation of greater success for pharmacists.

The speakers received a hearty applause and the meeting was adjourned.—S. W. MORRISON, *Secretary.*

DETROIT.

The February meeting of the Detroit Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held in the Y. M. C. A. building Thursday, February 14th. Thirty-two members and friends enjoyed the splendid dinner which preceded the session. President Byce called the meeting to order at 8:00 P.M. The minutes of the January meeting were read by the Secretary and approved.

There being no business to come before the ASSOCIATION, President Byce asked Mr. Ingram to introduce Carl Weeks as the speaker of the evening. Mr. Weeks started his talk with what he termed "monkey shines" by making Mr. Ciechanowsky, President of the Michigan State Pharmaceutical Association, honorary member of the order of the "Paris Handkerchief." Mr. Weeks gave a message of good cheer to the druggists, assuring them that the independent retailer would be here long after the chain had been forgotten. He dispersed the idea of many independents regarding the chain store operating costs. He said that the chain drug stores have their worries cut out for them. They lack the personality which the independent store enjoys. As a greater source of revenue they seek items that offer a larger profit. They are keenly interested in price protected merchandise, as that is their only salvation.

A general discussion followed, led by Mr. Webster, who asked Carl Weeks his opinion on the Cosmetic Bill which the American Medical Association is advocating. Mr. Weeks explained that the bill was nothing more than an

amendment to the Pure Food and Drugs Act, which in turn would stop the misbranding of toilet articles. Robert J. Ruth suggested that the AMERICAN PHARMACEUTICAL ASSOCIATION take up this legislation for the honest merchandising of cosmetics, as the druggist is vitally interested and not the physician. It is not proposed to regulate the sale of cosmetics by prescription as is supposed by many retailers. Mr. La Croix brought up the subject of the power of chain store buying. Mr. Ingram answered his question by saying that the average retailer puts too much stress on buying power and forgets selling power; success depends on selling power more than on buying power.

A rising vote of thanks was given the speaker for his most interesting and entertaining talk.—BERNARD A. BIALK, *Secretary.*

NORTHWESTERN.

A meeting of the Northwestern Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION and the Scientific and Practical Section of the Minnesota State Pharmaceutical Association was called to order February 7, 1929, at 1:30 P.M. in the Roof Garden of the St. Paul Hotel, St. Paul, Minn. Dean F. J. Wulling, Chairman of the Section and President R. Almin, of the Northwestern Branch, presided jointly. The following program occupied most of the afternoon.

An informal address by Dean LaWall of the Philadelphia College of Pharmacy.

"Problems of the Village Drug Store," by Mrs. George Douglas.

"Quantitative Estimation of Boric Acid in Antiseptic Solution," by R. Almin.

"Tuberculosis Prevention," by Dr. J. A. Myers.

"Some Notes on the U. S. P. Sodium Borate Test for Tragacanth," by Prof. E. B. Fischer.

"Biologicals," by R. C. Jones.

"Expansion Tables for 190 Proof Alcohol at Various Temperatures," by C. H. Rogers.

"The Graduation Requirement," by Dean Wulling.

"The Pharmacist and Accident Prevention," by Dean Wulling.

"Reports of Thirteen Committees for the Past Year, Mostly by Title."

Considerable discussion followed many of the papers.

The final order of business was the election of officers for the ensuing year. The nominating committee placed the names of the present officers for reëlection. There being no nominations from the floor, the report of the committee was made official by motion and the secretary cast the ballot for the officers.—C. V. NETZ, *Secretary.*

FEBRUARY 14TH.

A joint meeting of the Northwestern Branch and the Wulling Club of the College of Pharmacy, University of Minnesota, was called to order February 14th at 11:30 A.M. in the Auditorium of the College.

Secretary Bachman, of the Minnesota State Pharmaceutical Association, presented the scholarship medal for the past year to Miss Rose Weinerman. This medal is offered annually by the Minnesota State Pharmaceutical Association to the student attaining the highest scholarship in the first three years of work. In addition the recipient of the medal receives a fund sufficient to cover expenses of tuition and books in the fourth year. Miss Weinerman made a short, delightful speech of acceptance.

A short program followed in which the following students read papers:

Sidney Eggert: "An Old Drug Store," by W. L. DuBois, JOUR. A. PH. A., January 1929.

Maynard Nelson: "The Story of Rubber," *Practical Druggist,* January 1929.

Wm. Stebbins: "Insulin, the Cure for Diabetis," by Dr. R. M. Wilder, Minn. Alumni Weekly, January 11, 1923.

President Almin of the Northwestern Branch and President R. Laska, of the Wulling Club, presided during the meeting.—C. V. NETZ, *Secretary.*

PHILADELPHIA.

The February meeting of the Philadelphia Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was a symposium with the County Medical Society on the relationship of pharmacist and physician. It was held on Wednesday evening, February 20th, at the building of the County Medical Society, Philadelphia.

Dean Charles H. LaWall presented the side of pharmacy, concisely stating what modern professional pharmacy can do for medicine and what it can expect in return. In his talk, he said that pharmacy could not be judged by external appearances. Medical men, graduated prior to 1900 were more poorly trained than the present-day pharmacist.

In 1932, the minimum requirement of the pharmacist will be the four-year course leading

to the B.Sc. degree. The professional pharmacist is qualified to perform the duties of a scientific dispenser, and in addition he can carry out clinical tests and make bacteriological examinations. He may function in the capacity of a neighborhood pharmacist, a purely professional pharmacist, a hospital pharmacist, a pharmacognosist, etc.

Physicians are not taking advantage of the opportunities afforded them in the use of the professional services of the pharmacist. The dispensing doctor is more common than the prescribing pharmacist. One of the ways of obviating existing conditions is for more frequent joint meetings of pharmacists and physicians. At the close of Dr. LaWall's paper, Prof. E. Fullerton Cook and Mr. Ambrose Hunsberger conducted short discussions. Prof. Cook emphasized the fact that pharmacy is passing through a definite evolutionary period and may be expected to come into its own through its scientific development. Mr. Hunsberger called attention to the fact that no practice to-day is the victim of as many predatory interests as pharmacy and the pharmacist in self-defense has reverted to many devices to save himself. Pharmacists, as a class, recognize their obligations to society in general, and to the medical profession in particular.

The president of the County Medical Society, Dr. Orlando Petty, then called upon Dr. E. J. G. Beardsley, Professor of Clinical Medicine in Jefferson Medical College of Philadelphia to state the case for the physicians. Dr. Beardsley agreed with the previous speakers, that pharmacy at its best is a true profession and not a trade. In a pharmacist, the physician expects to find a man of character, a gentleman, an expert pharmacist, an expert chemist and an expert business man. Selfishness and self-interest are qualities that ruin the relations between physicians and pharmacists. If we (the physicians) want scientific pharmacists we must support them. For the good of the public, physicians and pharmacists must work in harmony.

Dr. Wilmer Krusen and Dr. Horatio C. Wood followed Dr. Beardsley with a few, terse, well-directed observations. Dr. Krusen pointed out that the doctor, the pharmacist, the nurse and the dentist are absolutely essential to public health. The underlying code of both pharmacy and medicine is the Golden Rule. A prescribing pharmacist is a menace to his community. Dr. Wood warned the physician not to forget what the pharmacist had done for medicine in his gift to the world of morphine, caffeine, etc. If conditions continue to develop as they are at the present, the true pharmacy in time will become scarce and the medical profession will be the loser. Pharmacy is suffering from unfair competition and, in its need, looks toward medicine for aid.

If the physician does not want to carry a large stock of drugs and compound his own prescriptions, he must coöperate with the scientific pharmacist.

A general discussion followed.

MARIN S. DUNN, *Secretary.*

PITTSBURGH.

Owing to the Influenza epidemic so prevalent in the city just preceding the holiday season the December meeting of the Pittsburgh Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was omitted.

The January meeting was held on the 22nd, at which time Dr. J. H. Wurdack presented the feature of the evening, his subject being "A Discussion of the Periodic Chart of the Atoms as Compiled by Henry D. Hubbard of the U. S. Bureau of Standards."

A committee was appointed at the close of this meeting to bring in nominations at the next regular meeting, for officers to serve the Branch for the ensuing year.

The February meeting was held on the 19th, at which time Dr. L. K. Darbaker, presented a number of reels of moving pictures showing, animal life, growing plants, circulation of protoplasm and chlorophyl in plants and many other interesting features of the same character.

The report of the nominating committee was received, there being no further nominations, the secretary was instructed to cast the ballot for the following nominees.

President, John G. Rees; *Vice-President,* Stephen Wilson; *Treasurer,* George Saylor; *Secretary,* Frank S. McGinnis; *Delegate to House of Delegates,* Dr. Louis Emanuel.

The next regular meeting is scheduled for the third Tuesday in March.

LOUIS SAALBACH, *Secretary.*

EDITORIAL NOTES

Editor: E. G. EBERLE, 10 West Chase St., Baltimore, Md.

Members of the Council, A. PH. A.: S. L. HILTON, *Chairman;* CHARLES H. LAWALL, *Vice-Chairman;* E. F. KELLY, *Secretary;* H. V. ARNY, A. G. DUMEZ, H. A. B. DUNNING, H. C. CHRISTENSEN, J. A. KOCH, J. H. BEAL, W. B. DAY, T. J. BRADLEY. *Ex-Officio Members:* D. F. JONES, *President;* A. W. PAULEY, W. H. ZEIGLER, *Vice-Presidents;* C. W. HOLTON, *Treasurer;* E. G. EBERLE, *Editor of the Journal;* A. G. DUMEZ, *Editor of the Year Book;* AMBROSE HUNSBERGER, *Chairman of the House of Delegates.*

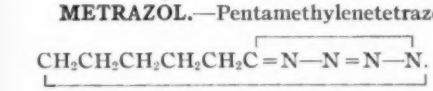
Collaborators: The Members of the Council; E. FULLERTON COOK, *Chairman,* U. S. P. Revision Committee; W. L. SCOVILLE, *Chairman,* N. F. Revision Committee; the Chairmen of the Sections, A. PH. A.; J. C. MUNCH, A. L. I. WINNE, P. H. DIRSTINE, R. B. ROTHROCK, LYMAN F. KEBLER; A. G. DUMEZ, *President,* A. A. C. P.; CHARLES B. JORDAN, *Chairman,* Executive Committee, A. A. C. P.; H. M. LEROU, *President,* N. A. B. P.; HENRY C. CHRISTENSEN, *Secretary,* N. A. B. P.

NEW AND NONOFFICIAL REMEDIES.

The following additional articles have been accepted as conforming to the Rules of the Council on Pharmacy and Chemistry of the American Medical Association for admission to New and Nonofficial Remedies. A copy of the Rules on which the Council bases its action will be sent on application.

W. A. PUCKNER, *Secretary.*

METRAZOL.—Pentamethylenetetrazol.—



Actions and Uses.—The action of metrazol is similar to that of camphor, but it is claimed to be more dependable, mainly on account of its greater solubility in water. Its action following injection intravenously or subcutaneously is induced promptly. Metrazol stimulates the vasomotor and respiratory centers in experiments on normal animals, but an experienced worker in this field found it a very uncertain respiratory stimulant in conditions of depressed respiration in animals, in which carbon dioxide, epinephrine and ephedrine were markedly effective; that as a circulatory stimulant it usually caused a rise of blood pressure only in convulsive doses; that it did make irregularly beating hearts beat more regularly, but only at expense of depression of rate and amplitude. The use of metrazol is reported as a sustaining agent and restorative in chronic cardiac and circulatory insufficiency, in pneumonia, and in other infectious diseases. It has been reported to be of value in the emergency of cardiovascular collapse, in shock, in respiratory failure, and in narcotic depression. On the other hand, it causes capillary dilatation in the splanchnic region, and animal experiments indicate that the intravenous injection may be distinctly dangerous. It may be combined with digitalis and the xanthine diuretics.

Dosage.—Intramuscularly or intravenously; 0.1 Gm ($1^1/_2$ grains) every one to three hours orally, from 0.1 to 0.2 Gm. ($1^1/_2$ to 3 grains, several times daily as required.

Manufactured by Knoll A.-G., Ludwigshafen a/Rh., Germany (E. Bilhuber, Inc., New York, distributor). U. S. patent 1,599,493 (Sept. 14, 1926; expires, 1943). U. S. trademark 249,687.

Metrazol Ampules, 1 cc.—Each ampule contains 1.1 cc. of a 10 per cent aqueous solution of metrazol.

Metrazol Tablets.—Each tablet contains $1^1/_2$ grains of metrazol.

Metrazol occurs as biaxial, optically negative, white crystals that are freely soluble in water. It melts at 57–58 C.

To a 10 per cent aqueous solution of metrazol add a saturated solution of mercuric chloride: a white solid precipitate results, which may be recrystallized from hot water or alcohol to yield crystals melting at 177–178 C, and leaving not more than 0.1 per cent of ash on incineration.

Transfer about 0.2 Gm. of metrazol, accurately weighed, to a wide mouth weighing bottle; allow to stand over calcium chloride: the loss in weight is not more than 0.1 per cent.

Transfer about 0.2 Gm. of metrazol, accurately weighed, to a platinum dish and incinerate: the ash is not weighable.

Determine nitrogen by the Dumas method as described in Clarke's Handbook of Organic Analysis, ed. 2, p. 199: the nitrogen is not less than 40.4 nor more than 40.9 per cent.

From *Jour. A. M. A.*, Dec. 15, 1928.

THE A. PH. A. RECIPE BOOK.

Pharmacists will be pleased with the announcement that the A. PH. A. Recipe Book is now ready. It is not the intention to speak of the book at length, nor to give its history, largely for the reason that the New York Branch, A. PH. A., will celebrate the event by presenting a copy to the Chairman of the Committee on Recipe Book, J. Leon Lascoff. The presentation will be made by his predecessor, Otto Raubenheimer. The first copy

will be a memorial to the late Henry P. Hynson, whose suggestion has now been brought to a reality. It is contemplated that the latter presentation will be part of the program at Rapid City, under the auspices of the Baltimore Branch A. PH. A.

The history and development of the Recipe Book will enter into the program of the New York meeting on Monday, March 18th, when honor and credit will be given to those who shared in the preparation and completion of the work. No one will take exception to the statement, at this time, which will become apparent to the users of the Book, that Editor Ivor Griffith has given much time and is entitled to commendation for his helpful efforts, which produced most satisfactory results.

The advertisement of the "Recipe Book" will be found on p. xxiii of this issue of the JOURNAL.

The **Committee on Recipe Book** is at present composed of the following: *Chairman*, J. Leon Lascoff, New York; *Editor*, Ivor Griffith, Philadelphia; E. N. Gathercoal, Chicago; H. L. Meredith, Fort Pierce; P. Henry Utech, Meadville; W. W. Horne, Fayetteville; S. L. Hilton, Washington; F. W. Nitardy, Brooklyn; H. A. Langenhan, Seattle; Otto Raubenheimer, Brooklyn; W. H. Glover, Lawrence; F. B. Kilmer, New Brunswick; W. L. Scoville, Detroit; C. P. Wimmer, New York; R. R. Gerstner, New York; J. K. Thum, Philadelphia; I. A. Becker, Chicago; C. J. Clayton, Denver; M. A. Davis, White Plains; C. M. Roehr, San Francisco; Robert P. Fischelis, Trenton; Bernard Fantus, Chicago, William Gray, Chicago; L. D. Havenhill, Lawrence; E. Fullerton Cook, Philadelphia.

The **Committee on Publications** has the folfollowing members: *Chairman*, A. G. DuMez, Baltimore; H. V. Arny, New York; William B. Day, Chicago; H. C. Christensen, Chicago; E. G. Eberle, Baltimore; E. F. Kelly, Baltimore; C. W. Holton, Essex Fells.

PERSONAL AND NEWS ITEMS.

Dr. A. R. L. Dohme was toastmaster of the fourth annual dinner of the drug, chemical and allied trades, at the Waldorf-Astoria Hotel, New York City, March 14th. Senator Dr. Royal S. Copeland was one of the speakers.

Donald S. Merrell, Director Dental Department of William S. Merrell Company recently delivered an address before the faculty of Laval University, the Dental College of the University of Montreal and the graduate dentists of McGill University.

David Costello, of New York City, recently presented Philadelphia College of Pharmacy and Science and New York College of Pharmacy with collections of historic mortars and shelf ware of a number of nationalities and periods.

Ivor Griffith, of Philadelphia, addressed the New York Branch, A. PH. A., at the February meeting, on "The Cosmetic Urge."

The late **Elden C. Dewitt,** manufacturer of proprietary medicine, left an estate valued at 5 million dollars.

Milton Campbell, president of H. K. Mulford Company, recently visited in Dallas, where, in his earlier years, he contemplated to make his home.

George Decker, of New York, favored the JOURNAL with photos of the home of Priestley, and also a copy of "Mrs. Reynolds and Hamilton" by "Gath." Among the characters of the romance are Priestley, Aaron Burr and others of that period.

George Judisch has favored us with an historical paper relating to Iowa Pharmaceutical Association, which organization celebrated its 50th anniversary this year. Further reference will be made to this paper in a succeeding issue of the JOURNAL.

Secretary Walter D. Adams advises that the Texas pharmacy bill, which carries the prerequisite provision will become a law, having passed both houses of the State Legislature.

Dr. Charles E. Caspari, dean of St. Louis College of Pharmacy celebrated the twenty-fifth anniversary of his membership in the faculty of that institution. He was guest at a dinner given in his honor, attended by the Alumni, fraternal organizations, faculty members and citizens.

Dean William C. Anderson was given a testimonial dinner on February 5th. About 300 friends and colleagues attended the function, to do him honor and give expression to the years of service on the State Board of Pharmacy, from which he has retired. **Dr. J. Leon Lascoff** presided as Chairman and Dr. George Diekman as toastmaster. The speakers dwelt on the various activities and qualities of the honor guest. Among those responding were Dr. James Sullivan, of the State Educational Department, Dr. George R. Hardin, Dr. Jacob Diner, Pincus Herz, George R. Christ, Nathaniel Nicolai, Dr. A. Percival Lohners and Thomas Brennan.

Fred T. Bridges, of Atlanta, has resigned as Secretary-Treasurer of the Georgia Pharma-

ceutical Association. He is succeeded by Dr. Robert E. Wilson, of Athens. The Secretary's office has been moved to Athens. Dr. Wilson is dean of the school of pharmacy, University of Georgia.

The *South Dakota Optimist* claims to be the first magazine in the United States published on cornstalk paper—quite a hit and the S. D. O. has our congratulations; it is newsy and always alive to the interests of South Dakota pharmacists.

ARMSTRONG CORK COMPANY MOVES OFFICES.

The Armstrong Cork Company announces the consolidation of the offices of all its divisions at Lancaster, Pennsylvania, effective April 1, 1929. This involves the removal from Pittsburgh of the General Office of the Company and all executive offices of the Armstrong Cork Company, Cork Division, and of the Armstrong Cork & Insulation Company, with the exception of the Purchasing Department, which will remain in Pittsburgh. All communications hereafter should be directed to the new address.

LEHN & FINK TO ACQUIRE L. LESQUENDIEU OF PARIS.

According to reports negotiations are proceeding by Lehn & Fink Products Company, for acquisition of J. Lesquendieu of Paris, manufacturers of perfume, cosmetics and toilet articles. It is stated (at time of report) proposal has not yet been submitted formally to directors but that such action will be taken shortly. Rumors are current this acquisition is first step in a general expansion program by Lehn & Fink contemplating several such acquisitions.

OBITUARY.

LOUIS CARL STAUDT.

Louis Carl Staudt died at his home in Aurora, Illinois, February 13th. Mr. Staudt was a pioneer pharmacist of Aurora, having been actively engaged in the drug business for more than fifty years. The Staudt Pharmacy was founded by John N. Staudt, Louis' father, in 1859, and was conducted under the name of Staudt & Karl until that partnership was dissolved in 1871, and the store continued under the name of John N. Staudt until his death in 1885, when it was reorganized by Louis C. and Albert J. Staudt as Staudt Brothers. In 1922, Herbert L. Neuman, was taken into the firm which was then incorporated under its present name of the Staudt & Neumann Company. Among the enterprises and organizations in which Mr. Staudt took an active part were the East Side school board, on which he served as a director for many years, the Old Second National Bank, the Improvement Building & Loan Association, the Union League club and the Elks club. During his entire business career Mr. Staudt took an active interest in civic affairs. He was also a life member of the AMERICAN PHARMACEUTICAL ASSOCIATION (joined in 1890) and the Illinois Pharmaceutical Association. Mr. Staudt's first wife was Miss Anna Allen of Aurora who died in 1906. In 1908 he married Miss Ruth Wells who survives him with three sons, John Guild, Edward Pomeroy and Louis Wells. He leaves two brothers, Fred H. of Aurora and Albert J. of Philadelphia and a sister, Miss Nellie Staudt of San Diego, California.—W. B. D.

OTTO FERDINAND CLAUS.

Dr. Otto F. Claus, member of the AMERICAN PHARMACEUTICAL ASSOCIATION, died February 23rd at St. Johns Hospital, aged 64 years. He was at one time owner of four drug stores in St. Louis, but owing to his increasing medical practice he severed his connection.

The deceased was born and reared in North St. Louis. After graduation from the St. Louis College of Pharmacy he continued his interest in the College and was at one time its president. He was a life member of Missouri Pharmaceutical Association, of the Cinchona Club. He joined the AMERICAN PHARMACEUTICAL ASSOCIATION in 1901; in 1910, he was elected second vice-president, and in 1918, Chairman of the Council and of the House of Delegates.

Mrs. Claus died several years ago; she attended many of the A. PH. A. meetings. He is survived by one daughter, Mrs. Richard F. Jeude.

EMRICH H. LADISH.

Emrich Herman Ladish, member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1905, died at Sacred Heart Sanitarium, Mil-

waukee, February 9th. For many years Mr. Ladish conducted a pharmacy at the corner of North State and Oak streets, Chicago. He was a former member of the N. A. R. D., Executive Committee and, formerly, an officer of the Chicago Retail Druggists' Associaton. In 1909, he was secretary of the Section on Practical Pharmacy and Dispensing, A. PH. A. The deceased was a member of the Chicago Veteran Druggists' Association.

CLARENCE O. BALLOU.

Word has just reached this office of the death of Clarence O. Ballou who died February 28th in the St. Luke's Hospital, Boise, from complications largely induced by an auto accident last summer. Mr. Ballou was one of the oldest druggists of this city from the standpoint of length of time in business, coming to Boise in 1893.

Mr. Ballou was one of the original few that started the Idaho State Pharmaceutical Association and has always been a faithful worker for the good of pharmacy. He became a member of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1909.

NARCISO RABELL CABRERO.

Ramon Lopez Irizarry, member of the AMERICAN PHARMACEUTICAL ASSOCIATION, has advised us of the death of our fellow-member Narciso Rabell Cabrero of San Sebastian. The latter joined the ASSOCIATION in 1915. He was well and favorably known as pharmacist in Porto Rico and also was considered an authority on archaeological subjects. We express sympathy and thank Mr. Irizarry for advising us of the passing of our Porto Rican frater.

EDWIN EDDY CALDER.

Dean Edwin E. Calder, of Rhode Island College of Pharmacy and Allied Sciences, died January 15th, at the Deaconess Hospital, Boston, Mass. As a result of infection in the foot, blood poison developed and amputation failed to check the gangrene.

Professor Calder was born in Providence; he was educated in the public schools and Brown University and, for a time, was instructor in analytical chemistry in his *Alma Mater*. Thereafter, until 1906, he held the chair of chemistry at the Boston University School of Medicine; he then was elected dean and professor of Rhode Island College of Pharmacy.

Mrs. Calder died several years ago, a daughter survives him.

HENRY R. GERING.

We are advised of the death of Henry R. Gering, which occurred several months ago in Plattsmouth, Neb. Mr. Gering had been in poor health for some time. He formed the Henry R. Gering Chemical Company, of Omaha, in 1909. Before establishing the latter business the deceased had been mayor of Plattsmouth, from 1903–1906. He joined the AMERICAN PHARMACEUTICAL ASSOCIATION in 1907.

FREDERICK ANTHONY SEAMAN.

F. A. Seaman, former druggist of Perth Amboy, N. J., died at the Daytona Hospital, Daytona, Fla., January 15th, aged 78 years. He had been in business at Perth Amboy for about a half century; for the past 25 years Mr. and Mrs. Seaman have resided in Florida. He retired from active business a number of years ago, when his son, Ralph Seaman, succeeded him.

The deceased was for many years a member of the Board of Aldermen in Perth Amboy; his antecedents settled in New Jersey before the landing of William Penn.

Mr. Seaman became a member of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1905. He is survived by his widow, two sons and a daughter, Mrs. Elizabeth Mitchell. Ralph Seaman is owner of the store in Perth Amboy, and Haddon Seaman conducts a pharmacy in Brooklyn.

Walter Buchler, senior member and managing director of Chininfabrik Braunschweig and Buchler & Co., Brunswick, Germany, died January 12th. He had been the directing head of the business for almost forty years.

John Torrey Burnett, president of the Joseph Burnett Company, flavoring extract manufacturer, Boston, died February 17th at his home in that city. Mr. Burnett was born April 23, 1868, at Southboro, Mass. Following graduation from Harvard in 1890, he entered the business founded by his father, a charter member of the AMERICAN PHARMACEUTICAL ASSOCIATION.

C. W. Engborg, vice-president of the Kansas Pharmaceutical Association, died at his home in McPherson, February 14, 1929. Mr. Engborg was born in Sweden, coming to this country at the age of 19, he located at Salina where he entered the drug business. A year

later he and his brother opened a drug store at Assaria, but soon moved to McPherson where he has been engaged in the retail drug business the past forty-two years. Mr. Engborg was one of the most respected and influential citizens of McPherson county, highly interested and active in all civic enterprises and one of the most ardent and faithful members of the Kansas Pharmaceutical Association. Mr. Engborg was 66 years of age. His son Paul has been associated with his father and will continue the business.—*K. P. A. News Letter.*

Dr. Felix A. Boericke, head of Boericke & Tafel, homeopathic medicine manufacturer, Philadelphia, died February 23rd at his home in Bryn Athyn, Pa., aged 72 years. Dr. Boericke studied engineering at the University of Pennsylvania and in Germany, and on his return to this country completed a medical course at Hahnemann Homeopathic College, Chicago. The firm which he headed was established by his father seventy-five years ago.

D. W. Munn—father of **A. R. Munn,** President of Georgia Pharmaceutical Association, and **George Munn,** Atlanta retail pharmacists—died at Ozark, Ala., following an attack of influenza.

Asa Candler, for a number of years a retail druggist of Atlanta and later manufacturer of Coca Cola, died March 12th, aged 78 years. Mr. Candler was influential in advancing the interests of his home city and state.

Joseph Taylor Brown, the oldest graduate of Massachusetts College of Pharmacy died March 8th, at his home in Boston. He graduated in 1869, and was eighty-one years of age. The deceased and Prof. George F. H. Markoe were partners in the store of the former's father, the firm name becoming Joseph T. Brown & Co.—J. G. G.

SOCIETIES AND COLLEGES.

ERROR IN ADDRESS OF BOARD OF CANVASSERS.

Inadvertently the addresses of the members of the Board of Canvassers, in announcing the election of officers, were incorrectly given; they are: Glenn Cook, Fargo, No. Dak.; Oscar Hallenberg, Fargo, No. Dak.; H. O. Tiegen, Moorhead, Minn.

SCIENTIFIC SECTION.

To the Members of the Scientific Section, A. PH. A.:

It may seem a little early, but we hope that this preliminary appeal will be given serious consideration.

The seventy-seventh annual convention of the AMERICAN PHARMACEUTICAL ASSOCIATION will be held August 26–31, 1929, at Rapid City in the Black Hills of South Dakota.

As members of the Scientific Section we look to you to help the officers make this meeting as instructive and interesting as possible. Some of you may not have realized that this will be the last regular meeting before the 1930 Pharmacopœial Convention, from which papers can be published for the consideration of the Pharmacopœial Convention.

Will you, therefore, please decide as soon as possible upon a title or titles for your contributions to this meeting of the Scientific Section and submit these together with a short abstract to the Secretary by June 1st? We must have your early coöperation in order to get the titles on the official program and the abstracts multigraphed for distribution at the meeting, so we are giving you four months for this preparation.

(Signed) L. W. ROWE, *Secretary,*
J. C. MUNCH, *Chairman.*

SECTION ON PRACTICAL PHARMACY AND DISPENSING.

The Section on Practical Pharmacy and Dispensing, A. PH. A. is preparing for the 1929 meeting of the ASSOCIATION and is inviting contributions of papers to the Section. Prospective contributors are asked to write to one or the other of the officers of the Section so that the paper will be properly listed.

(Signed) H. C. NEWTON, *Secretary,*
P. H. DIRSTINE, *Chairman.*

OFFICERS OF THE SECTIONS.

Scientific Section.—*Chairman,* J. C. Munch, % Sharp & Dohme, Baltimore, Md.; *First Vice-Chairman,* H. A. Langenhan, % U. of Washington, Seattle; *Second Vice-Chairman,* W. G. Crockett, % Medical College Va., Department of Pharmacy, Richmond, Va.; *Secretary,* L. W. Rowe, % Parke, Davis & Co., Detroit, Mich.; *Delegate to the House of Delegates,* Paul S. Pittenger, % Sharp & Dohme, Baltimore, Md.

Section on Education and Legislation.—*Chairman*, A. L. I. Winne, 601 W. 24th St., Richmond, Va.; *Vice-Chairman*, L. D. Havenhill, % U. of Kansas, Lawrence; *Secretary*, Glenn L. Jenkins, Lombard and Greene Sts., Baltimore, Md.; *Delegate to House of Delegates*, M. N. Ford, Columbus, O.; *Alternate Delegate*, Charles F. Poe, Denver, Col.

Section on Practical Pharmacy and Dispensing.—*Chairman*, P. H. Dirstinè, Pullman, Wash.; *Vice-Chairman*, E. O. Leonard, Pocatello, Ida.; *Secretary*, H. C. Newton, % Creighton University, Omaha, Neb.; *Delegate to House of Delegates*, H. A. Langenhan, Seattle, Wash.

Section on Commercial Interests.—*Chairman*, R. B. Rothrock, Mount Vernon, Ind.; *Vice-Chairman*, Denny Brann, 421 Sixth Ave., Des Moines, Ia.; *Secretary*, Joseph G. Noh, 321 State Theatre Bldg., Harrisburg, Pa.; C. Leonard O'Connell, *Delegate to the House of Delegates*, Pittsburgh, Pa.

Section on Historical Pharmacy.—*Chairman*, Lyman F. Kebler, 1322 Park Road, Washington, D. C.; *Secretary*, George D. Beal, University of Pittsburgh, Pittsburgh, Pa.; *Delegate to the House of Delegates*, Ambrose Mueller, Webster Grove, Mo.; *Historian*, E. G. Eberle, 10 W. Chase St., Baltimore, Md.

A. PH. A. COMMITTEE ON COSMETICS.

President Jones has appointed George D. Beal, A. G. DuMez and Charles H. LaWall members of the Committee on Cosmetics. The Committee held its first meeting on March 2nd.

JOINT MEETING OF MEMBERS OF STATE BOARDS OF PHARMACY AND DELEGATES OF THE FACULTIES OF COLLEGES OF PHARMACY IN N. A. B. P. DISTRICT NUMBER TWO (N. Y., N. J., PA., DEL., MD., D. C.).

Members of Boards and Faculties of District No. 2 met in Atlantic City, March 11th and 12th. The introductory remarks were made by Chairmen J. W. Sturmer and Lloyd N. Richardson. Among the papers and discussion were the following:

"Pharmacy in Its More General Aspect"—Charles H. LaWall; Discussion opened by William C. Anderson. "State Board Examinations in Pharmacy"—Jacob Diner; Discussion opened by members of the Boards of Pharmacy of Pennsylvania and the District of Columbia. "Practical Pharmacy and Dispensing"—Curt P. Wimmer; Discussion by Willis G. Gregory and W. Paul Briggs. "How Practical Examinations Are Conducted by the New Jersey Board"—Harry E Bischoff; Discussion opened by a member of the Maryland Board of Pharmacy. "Practical Pharmacy Examinations in General"—A. C. Taylor, District of Columbia Board; Discussion opened by a member of the New York Board of Pharmacy.

MONDAY AFTERNOON SESSION.

"General and Inorganic Chemistry"—Ernest Little; Discussion opened by Hugh C. Muldoon. "Organic Chemistry"—A. G. DuMez; Discussion opened by J. A. Koch. "What is the Object of State Board Examination Questions in Chemistry?"—Lucius L. Walton; Discussion opened by a member of the Delaware Board of Pharmacy. "Materia Medica"—William Mansfield; Discussion opened by Horatio C. Wood. "State Board Examinations in Materia Medica"—John O. Bosley; Discussion opened by a member of the Pennsylvania Board of Pharmacy. "Mathematics Applied to Practical Pharmacy"—Lloyd N. Richardson; Discussion opened by a member of the New Jersey Board of Pharmacy.

6:30 P.M. Dinner at Hotel Chelsea under the auspices of the Atlantic County Drug Club.

TUESDAY MORNING SESSION.

"The More Recent Research Developments in Pharmacy"—John C. Krantz, Jr. "Bacteriology—Public Health and Sanitation"—John E. Minehart. "Educational Progress and Board of Pharmacy Members"—R. L. Swain.

PREPARATIONS FOR THE A. PH. A. MEETING IN RAPID CITY.

Local Secretary, Floyd W. Brown of the A. PH. A. has appointed the following as chairmen of various committees to aid him in carrying on the work of preparation for the meeting in Rapid City: *Publicity*, R. L. Bronson, secretary of Rapid City Chamber of Commerce; *Finance*, Richard Ottman; *Reception*, C. B. Baldwin; *Entertainment*, C. L. Doherty; *Women's Reception*, Mrs. Richard Ottman; *Program*, Dean E. R. Searles; *Hotels*, Charles Fallon; *Transportation*, Arthur Nielson.

Secretary Brown met with the pharmacists of the section adjacent to Rapid City for a conference relative to the A. PH. A. Convention. Much enthusiasm prevailed and it was decided to organize the "Hills Country" and for this

purpose Otto L. Uhlig of Spearfish was elected *President* of the Black Hills Western Review Unit; Claire Severn of Philip, *Vice-President*, and C. L. Doherty of Rapid City, *Secretary and Treasurer*. This organization embraces all of the Hills country, the northwest line east of Pierre and the territory from Chamberlain west. Others in attendance were Fred Vilas, Pierre; Senator L. E. Highley, Hot Springs; Vic. Stahlberg, Lead; G. E. Gustine and Emil Hargens, Hot Springs; E. H. Vis, Wasta; C. B. Baldwin, A. Nielson, C. M. Fallon, Richard Ottman, and R. L. Bronson of Rapid City. Another meeting of the Unit will be held in April.

The pharmacists of South Dakota who are not members of the A. PH. A. are invited to send their applications for membership to one or the other of the following: Dean E. R. Searles, of Brookings; George A. Bender, Watertown; L. E. Highley, Hot Springs; J. J. McKay, Pierre; P. K. Bernhart, Sioux Falls.

South Dakota is justly proud of the Black Hills and words fail to describe their unrevealed splendor. The local Committee plans to conduct a tour to the beauty spots of the Hills during the week of the Convention.

IOWA PHARMACEUTICAL ASSOCIATION.

The Golden Anniversary meeting of the Iowa Pharmaceutical Association proved a great success in every particular. Among the speakers of the convention were Samuel C. Henry, Bruce Gates, Harry S. Noel and Dr. Krebs.

Resolutions were adopted endorsing a Pharmacy Corps in the U. S. Army; votes of appreciation were extended to Secretary J. W. Slocum for his services in making the convention a success, and to George Judisch for the addition of $200.00 to the Lillian Judisch Memorial Fund. Mr. Judisch was also presented with a diamond stick pin in recognition of his valuable services rendered as Chairman of the Legislative Committee during the past twelve years.

The following officers were nominated for the coming year: *President*, R. M. Gibson, Des Moines; *First Vice-President*, P. J. Jepson, Newton; *Second Vice-President*, E. L. Beezley, Cedar Rapids; *Third Vice-President*, J. S. Veenker, Northwood; *Treasurer*, J. M. Lindly, Winfield; Delegate to A. PH. A., George Judisch, Ames.

The following were recommended for appointment to the State Board of Pharmacy: W. W. Haire, Ft. Dodge; J. H. Weber, Cascade; A. J. Killmer, Mason City; J. J. Gillespie, Des Moines.

Iowa Druggists have organized a Veteran Association of which Emil L. Boerner of Iowa City is the *President;* George Judisch of Ames, *Vice-President;* John G. Becker, Dubuque, *Corresponding Secretary;* J. M. Lindly, Winfield, *Recording Secretary;* H. E. Eaton, Des Moines, *Treasurer;* Edward Bueckner, Dyersville, *Sergeant-at-Arms.*

OFFICERS NORTHWEST PHARMACEUTICAL BUREAU.

The following officers have been elected of the Northwest Pharmaceutical Bureau: *President*, Henry C. Kruckeberg; Minneapolis; *Vice-President*, W. F. Sudro, Fargo; *Treasurer*, Al Falkenhainer, Algona, Iowa; *Secretary*, J. W. Slocum, Indianola, Iowa; J. J. Gillespie, Des Moines; A. L. Malnis, Duluth and D. F. Jones, Watertown, were named members of the *Executive Committee.*

NOMINEES MINNESOTA PHARMACEUTICAL ASSOCIATION.

The nominees of Minnesota State Pharmaceutical Association for 1930–31 to be voted on by mail ballot are the following: *President*, N. Vere Sanders, Albert Lea; Joseph Vadheim, Tyler; *First Vice-President*, R. H. G. Netz, Owatonna; J. B. Tomhave, Montevideo; *Second Vice-President*, Harriet James, Two Harbors; Margaret Armitage, Princeton; *Third Vice-President*, J. A. Carman, Detroit Lakes; Guy Hovland, Dawson; *Secretary*, Gustave Bachman, Minneapolis; W. C. Muesing, New Ulm; *Treasurer*, H. Martin Johnson, St. Paul; K. K. Keller, Minneapolis; *Executive Committee*, G. A. Thompson, St. Paul; C. A. Ringdahl, Brandon.

Miss Marie Piesinger, of Northfield, Minn., has been granted a Life Membership in the Minnesota State Pharmaceutical Association. Miss Piesinger is the first woman to be granted a Life Membership by that organization.

UNIVERSITY OF WISCONSIN DRUG COLLECTION MOVED INTO NEW QUARTERS.

The drug collection started by Dr. Frederick B. Power has been moved into new quarters in the Chemistry Building at the University of Wisconsin. The oldest group dates from 1893 when Dr. Frederick Hoffman contributed a collection of cinchona barks that had been at

the University of Berlin. The items from the Philippines were contributed by two students and a Chinese collection was gathered and donated by Chinese students. Dr. Edward Kremers is building up the collection and now has increased facilities for taking care of it.

LEAGUE FOR PREVENTION OF HAY-FEVER.

At a meeting of the advisory council of the League for the Prevention of Hay-Fever, Dr. Bernard Fantus was elected *Chairman* and Dr. William A. Evans, Dr. Leon Unger, Dr. Siegfried Maurer, Mr. Bernard C. Roloff and Prof. William B. Day members of an *Executive Committee*, which is to include *ex-officio*, a representative of the city health department and of the Chicago Medical Society. The council will undertake to devise ways and means of organizing a lay society composed of sufferers from hay-fever and persons interested in them for the purpose chiefly of eradicating ragweed from the metropolitan district of Chicago in the hope of minimizing hay-fever.

HOSPITAL PHARMACISTS ASSOCIATION OF SOUTHERN CALIFORNIA.

The Hospital Pharmacists Association, of Southern California, has been organized; the president is Claude R. Simpson, and the Secretary is Grace Palmer; they may be addressed at 2826 Hope St., Los Angeles. This organization should be suggestive to pharmacists in other large cities. The AMERICAN PHARMACEUTICAL ASSOCIATION holds membership in the American Conference of Hospital Service, and we suggest that hospital pharmacists meet with the AMERICAN PHARMACEUTICAL ASSOCIATION at Rapid City. The Conference of Pharmaceutical Association Secretaries meets with the A. PH. A.

The Hospital Pharmacists Association is issuing a monthly bulletin and we invite them to send their national messages through the JOURNAL.

U. S. P. EXHIBIT FOR A. M. A. MEETING.

Preparations are being made for an exhibit of U. S. P. preparations during the meeting of the American Medical Association at Portland, Ore., in June. The Committee is composed of Dean A. O. Mickelsen, Secretary Frank Ward, Oregon Board; President Frank Nau, Portland R. D. A.; Deans L. J. Fitzpatrick, C. W. Johnson, Professors M. A. Starkman, H. M. Burlage and E. T. Stuhr and Editor Fred C. Felter, will assist in the work.

AMERICAN DRUG MANUFACTURERS' ASSOCIATION.

Secretary Carson P. Frailey has announced that the 18th Annual Meeting of the American Drug Manufacturers' Association will be held May 2nd–7th at Grove Park Inn, Asheville, N. C. It will be noted that there is an intervening Sunday; also, social activities are to be given prominent place on the program, and members are asked to bring the ladies.

The scientific sessions will be held May 2nd, the Biological, Pharmaceutical and Crude Drug divisions on May 3rd. The annual dinner will be held May 7th.

AMERICAN PHARMACEUTICAL MANUFACTURERS' ASSOCIATIONS.

Secretary J. G. Searle advises that the annual meeting of the American Pharmaceutical Manufacturers' Association will be held in Chamberlin-Vanderbilt Hotel, at Old Point Comfort, Va., June 3rd–7th.

COÖPERATIVE WHOLESALE DRUGGISTS TO CONVENE.

The mid-winter meeting of the members of the Federal Wholesale Druggists' Association will be held March 19th and 20th at the Manufacturers' Club, Philadelphia. It is expected by officers that all of the member companies in the United States and Canada will be represented by their managers or otherwise. The business accumulated since the last annual meeting will be discussed, and the time and place of the next yearly gathering in September will be decided upon. The meeting will open at 2:00 P.M., March 19th.

OFFICERS OF THE R. I. PHARMACEUTICAL ASSOCIATION,

Arthur W. Boston, of Providence, was elected *President* of the Rhode Island Pharmaceutical Association at the annual meeting of the organization held in Providence, January 9th. Other officers chosen are: *Vice-President*, Arthur B. Martel, Woonsocket; *Secretary*, Clifford Premeau, Providence; *Treasurer*, John J. Pastille, Providence; *Executive Committee*, William A. Cahill and Louis J. Guny, of Providence.

MARYLAND ASSOCIATIONS.

Maryland State Pharmaceutical Association will meet at Ocean City, Md., June 25th–28th. The Baltimore Retail Druggists' Association held its annual dinner March 14th at Hotel Rennert. President Samuel Y. Harris presided over the function. Among the guests were Mayor Broening, Council President Bryant and Health Commissioner Jones. Many Washington pharmacists attended. President Harris is a prominent member of Baltimore's City Council.

MID-WINTER MEETING OF THE MAINE ASSOCIATION.

Among the speakers at the mid-winter meeting of the Maine Association—held February 14th at Augusta, Me.—were the following: Governor William Tudor Gardiner, James F. Finneran, of Everett, Mass.; Carl G. A. Harring, president of the Boston Retail Druggists' Association and former president of the Massachusetts Pharmaceutical Association.

TEXAS HAS A PHARMACY LAW WITH PREREQUISITE REQUIREMENTS.

Texas pharmacists are rejoicing because of the passage of a pharmacy law which includes as a prerequisite—graduation from a college of pharmacy, approved by the Board. This is the third pharmacy law Texas has placed on the statute books—the first a District Board law which was followed by the one now in force and the bill passed will become operative after 90 days. Thirty-seven states now have prerequisite laws and there probably will be several more before the close of the sessions of state legislatures.

OFFICERS OF DRUGGISTS' SUPPLY CORPORATION.

The Druggists' Supply Corporation, which heretofore has only purchased sundries for its constituent members, contemplates extending its services to include the buying of drugs and chemicals. The officers are: *President*, William Jay Schieffelin, chairman of the board of Schieffelin & Co., New York; *Vice-Presidents*, George H. Huff and C. Mahlon Kline; *Secretary*, Francis E. Holliday, New York; *Treasurer*, William P. Ritchey; *Manager*, M. P. Hopkins; and *Directors*, J. M. Penland, William Jay Schieffelin, A. J. Greer, William P. Ritchey, William Ochse, Walter Brunswig, H. I. Fox, H. J. Bowerfind, H. J. Frank, F. E. Yahr, T. H. Lyons, Jr., F. E. Holliday, George H. Huff and C. Mahlon Kline.

A call has been sent to executives of the corporation houses to meet at the Coronado Hotel, St. Louis, April 22nd to 24th.

NEW OFFICERS OF VETERAN DRUGGISTS' ASSOCIATION.

Cleveland V. D. A. was organized February 12th. The following officers were elected: *President*, Eugene Remy; *Honorary President*, Carl Schmitt; *Secretary* and *Historian*, Carl Winter.

San Francisco V. D. A. has elected the following officers: *President*, Frank T. Green; *Vice-Presidents*, James C. Casselman and J. H. Flint; *Secretary-Treasurer*, Harry Schwartz.

Cincinnati V. D. A. has adopted resolutions in memory of Alfred DeLang, who was for six decades an outstanding figure and pharmacist in Cincinnati.

OFFICERS OF THE SOCIETY FOR THE HISTORY OF PHARMACY (FRANCE).

At the last meeting of the Society for the History of Pharmacy, a number of prominent pharmacists were present. The Staff of the Society is now composed of *President*, M. le doyen Radais; *Vice-Presidents*, M. M. Camille Bloch and L. G. Toraude; *Secretaries*, Dr. Dorveaux and E. H. Guitard; *Treasurer*, M. Andre Royer.

A number of industrial firms desiring to help the disinterested work of the Society, which is an honor to French pharmacy, have taken advantage of the new by-law in the constitution and have joined the Society as benefactory members.

Pharmaciens Bibliophiles.—Established under the auspices of the Society for the History of Pharmacy, a new group, called "Pharmacol Bibliophiles," elected the following officers: *President*, M. Leon Comar; *Vice-President*, M. M. Bertaut and Beytout; *Secretary*, M. E. H. Guitard; *Treasurer*, M. Sergent; *Counselors*, Prof. Olivier and M. Toraude. The Society is going to publish for its members, the number of which is strictly limited, a *de luxe* edition of some beautiful work. The first one will be a comedy of Moliére, richly illustrated.

Colorada and Kansas are now numbered among the "Prerequisite States."

LEGAL AND LEGISLATIVE.

STATE LEGISLATION.

Arizona House has passed Bill 95, which prohibits the use of the name drug store or related terms for places in which a registered pharmacist is not employed.

The Colorado Pharmacy Bill has been signed by the Governor. The law becomes effective five years hence.

North Carolina Senate Bill 364 provides for the licensing of mouth hygienists by the board of dental examiners to teach and practice mouth hygiene in the public schools of the state. Senate Bill 476 makes it unlawful for any person firm or corporation to sell at retail any spectacles, eye glasses or lenses unless a duly licensed physician or a duly qualified optometrist is in charge of and in personal attendance at the place where such articles are sold.

Idaho and West Virginia, and other states, are fighting tax bills; Kansas has been successful in killing a measure providing for taxes on tobacco and cosmetics.

Iowa Senate and House have passed House Bill No. 96, which provides for the suspension of licenses of physicians and pharmacists, who have been convicted by liquor law and narcotic laws.

Maryland is considering several laws that apply in one way or another to pharmacy but none of them have been brought to enactment.

New Jersey pharmacists attended a public hearing on Assembly Bill No. 116, which would permit wider sales of medicines by general merchants. The latest report from Secretary Fischelis is to the effect that the Bill would not be favorably reported.

Pennsylvania Senate Bill 505 prohibits the compounding, dispensing and preparation of drugs, medicines or poisons except by a duly registered pharmacist or assistant pharmacist and charges the state board of pharmacy with the duty of enforcing the law.

The Pennsylvania Board of Pharmacy has voted to extend the present requirement of a three-year course in pharmacy for Pennsylvania to four years. The decision was made at a meeting of the Board with the pharmacy schools of the state.

Texas Senate and House have passed the Pharmacy Bill which includes the prerequisite of College of Pharmacy graduation.

South Dakota Senate Bill 77 amends the law relating to the State board of pharmacy by defining "pharmacopœia" as the latest edition of the Pharmacopœia of the United States and "National Formulary" as the latest edition of that work published by the AMERICAN PHARMACEUTICAL ASSOCIATION.

A Washington State Bill providing for limitation of the hours of service by employees of drug stores has been killed.

CAPPER-KELLY FAIR TRADE BILL.

The Committee on Interstate and Foreign Commerce of the House of Representatives today voted to receive the favorable report of its sub-committee on the Capper-Kelly Fair Trade Bill and, under a gentlemen's agreement of its members, to list the Bill for action immediately the Committee shall be organized in the new Congress.

Such an agreement was made possible by the fact that, with the exception of two minority Representatives, the membership of the Committee will be unchanged.

Contemporaneously, Senator Capper proposes to press the bill, in the Senate, at the coming Spring session to begin in April.

In the meantime, the complete report of the Federal Trade Commission's fact finding inquiry on the subject will be available and should furnish a basis and reason for expeditious action.

JONES PENALTY BILL.

"On February 19 the Senate passed the Jones Bill, S. 2901, amending the National Prohibition Act so as to provide that wherever a penalty or penalties are prescribed in criminal prosecution for the illegal manufacture, sale, transportation, importation or exportation of intoxicating liquor, the penalty imposed for each such offense shall be a fine not to exceed $10,000 or imprisonment not to exceed five years, or both: Provided, that it is the intent of Congress that the court, in imposing sentence hereunder, should discriminate between casual or slight violations and habitual sales of intoxicating liquor, or attempts to commercialize violations of the law. The Act shall not repeal nor eliminate any minimum penalty for the first or any subsequent offense now provided by the National Prohibition Act. The points made against the Jones-Stalker penalty bills by the administrative legal representatives of the N. A. R. D. were recognized and concessions were made before the passage of the Jones bill. *Brokmeyer Bulletin*, Feb. 23, 1929.

LEGAL IMPORTS OF NARCOTICS ORDERED DECREASED IN 1929.

The Federal Narcotic Board, consisting of the Secretaries of State, Treasury and Commerce, at a meeting March 8th, announced orally that the amount of narcotics that may be legally imported into the United States during the calendar year 1929 had been decreased.

Imports of opium were fixed at 135,790 pounds, or 8 per cent less than in 1928, while receipts of coca leaves will be limited to 176,000 pounds, or 25 per cent less than last year, it was stated by the secretary of the Board, L. G. Nutt.

NARCOTIC COMPROMISES.

Section 3229 of the Revised Statutes provides that: "The Commissioner of Internal Revenues with the advice and consent of the Secretary of the Treasury, may compromise any civil or criminal case arising under the internal revenue laws instead of commencing suit thereon; and, with the advice and consent of the said Secretary and the recommendation of the Attorney-General, he may compromise any such case after a suit thereon has been commenced."

THE CALIFORNIA SUPREME COURT DECISION IN THE "GROCERS'" CASE.

Secretary W. Bruce Philip states that "Some of the newspaper reports on the above named decision were not entirely correct, inasmuch as the newspapers stated that hereafter no patent medicines could be sold except by registered pharmacists. The sale of patent medicines was not at issue. The question was 'Can retail grocers or general dealers located within three (3) miles of a drug store sell the list of household preparations, drugs, and chemicals allowed by our State law to be sold by grocers or general dealers having a permit from the California State Board of Pharmacy and by location being three (3) miles or more from a drug store?' This list is found in Section No. 16 of the Pharmacy Act and is as follows: Tincture of arnica, spirit of camphor, almond oil, distilled extract witch-hazel, syrup of ipecac, syrup of rhubarb, hive syrup, sweet spirits of nitre, tincture of iron, Epsom salts, Rochelle salts, senna leaves, carbonate of magnesia, Seidlitz powders, quinine, cathartic pills, chamomile flowers, caraway seed, chlorate of potash, moth balls, plasters, salves, ointments, peroxide of hydrogen, gum camphor, blue ointment, asafœtida, saffron, anise seed and saltpeter.

"The attorneys for the grocers did endeavor to classify these medicines with patent medicines and trade-marked preparations and in this way obtain the advantage of the Supreme Court decisions that have uniformly held that trade-marked patent medicines—those not containing narcotics or poisonous drugs—can be sold by any dealer without danger to the public. They also endeavored to prove that the restriction allowing some grocers, on account of location, to sell these drugs and other grocers, on account of location, not to sell these drugs was an unfair distinction and favored a portion of a class and therefore was unconstitutional. The Supreme Court decided the case strictly on the articles at issue, namely, the sale of the list of drugs previously mentioned and held that the three (3) mile limit was reasonable and within police power to regulate the sale of medicines."

HIGHER DUTY ON INEDIBLE BLACKSTRAP MOLASSES OPPOSED.

Because blackstrap molasses is a very important source of industrial alcohol, the National Wholesale Druggists' Association and American Manufacturers of Toilet Articles have presented a strong protest against higher duty thereon. Mr. Crounse closes the protest as follows:

"Specifically, the drug and toilet goods industries have for their foundation industrial alcohol, both pure and denatured. A vast amount of research has been devoted to reducing the amount of alcohol present in the products of these important branches of industry, but the irreducible minimum has been reached and any increase in the cost of this essential material will be nothing less than a calamity, both to manufacturer and consumer.

"It is our earnest hope that your committee in its wisdom will unhesitatingly reject the demand for any increase in the present duty on inedible blackstrap molasses. A higher duty would impose a heavy burden upon the entire population of the country and would be of no substantial aid to the agricultural interests in whose behalf it is urged."

FOR NARCOTIC ADDICTS.

A bill authorizing preliminary steps toward the establishment of two Federal narcotic farms for the treatment of prisoners who are drug addicts has been passed by Congress. Its purpose is to relieve congestion in Federal penitentiaries, separate addicted prisoners from those who are not, and provide a means of treating addicts with a view to breaking the drug habit.

BOOK NOTICES AND REVIEWS.

Recherches Pharmaco—anotomiques sur Pimpinella Saxifraga L. et P. magna L. Pharmaco—anatomic researches on *Pimpinella Saxifraga* L. and *P. magna* L., by JACOB MICHLIN, M.Ph., Pharmacist. Thesis presented to the Faculty of Science of the University of Lausanne, to obtain the degree of Sc.D. Paris Librairie Louis Arnette, 1926. 129 pages. 27 figures. A most painstaking piece of work. The author studies the anatomy of the vegetative organs of these two species of Pimpinella in great detail. The work is divided into five chapters, and a résumé and conclusion. In Chapter I, he describes the germination of the seeds, the plantlets and their primary structure. In Chapter II, he takes up the secondary structure of the roots. In Chapter III, he gives descriptions of the anatomical structure of the adult roots of the two species used as drugs and their adulterants. He gives here also a table, showing the comparative physical and anatomical characteristics of the two roots and three other roots, Radix Pastinacæ, Radix Heraclei and Radix Peucidani, generally found with them as adulterants. In Chapter IV, he describes the structure of the stems and petioles, and in Chapter V he describes the leaf.

In the Résumé and Conclusions, the author condenses the more interesting and important facts, stating first those that are alike for the two species, and second, those in which the two species differ. 1. The primary structure and development. The cortex of the root is homogeneous in both species, and is composed of isodiametric cells separated by triangular passages. The endodermis offers nothing peculiar, the Casparian dots appearing very early on the lateral walls. There are twelve secretory canals, originating from twelve pericyclic cells. According to Van Tieghem the number of canals vary among the Umbelliferae from 14–28, whereas the Pimpinellae examined have but twelve. The primary structure of the root is diarch (and not triarch as maintained by Holfret and Tschirch). The formation of the cambium is noticed at the end of 10–15 days. It at first is more active on the external side, and only a little later lays down vessels opposite the phloem, and medullary ray against the primary xylem sectors. The epidermal layers begin to exfoliate. The pericycle divides tangentially and radially and gives rise to a phellogen layer which soon develops a zone of cork. The pericyclic secretory canals—there are as yet no other, find themselves between the cork and the altered phloem. After the exfoliation of the primary cortex, the root within 6–8 weeks takes on the aspect of the adult root. Ligneous fibers and secondary secretory canals do not form until the second year; then all the cortical parenchyma contains secondary canals arranged in radial rows in concentric circles. These canals differ from the primary pericyclic canals by their smaller caliber and by the number of epithelial cells.

2. Comparison of the anatomical characters of the adult vegetative organs of *Pimpinella Saxifraga* and of *P. magna*. Root.—Less long and darker in *P. Saxifraga* than in *P. magna*. Bark and wood of the same thickness in *P. Saxifraga;* bark thicker than the wood in *P. magna*. Fibers around the vessels, lignified and more numerous, with lumen smaller in *P. magna* than in *P. Saxifraga*. Medullary rays thicker (5–8 rows), cells only slightly elongated, the ray enlarging towards the periphery in *P. magna;* less thick (3–6 rows), not elongated, and much the same thickness throughout in *P. Saxifraga*. The lack of radial elongation of the cells of the medullary ray, contrary to that observed among other Umbelliferae is, it seems to the author the most evident characteristic, which permits one to distinguish the drug from its adulterants. Secondary secretory canals are more numerous in *P. magna* than in *P. Saxifraga*, in the latter, however, being broader (20–50 M in *P. magna*, against 30–70 M in *P. Saxifraga*). The primary secretory canals are larger than the secondary canals in both species, being larger in *P. magna* than in *P. Saxifraga*.

With equal care the author summarizes the characteristics of the stem, the petiole and the leaf, and shows how the two species differ also in these organs.—CHARLES C. PLITT.

Organic Laboratory Methods. By the late PROFESSOR LASSAR-COHN. Authorized translation by Ralph E. Oesper, Ph.D. of the General Part of the 5th Revised German Edition. Edited by Rodger Adams and Hans T. Clarke. The Williams and Wilkins Company, Baltimore, Maryland. Price $6.50.

This volume is number two of the World Wide Chemical Translation Series edited by E. Emmet Reid, Professor of Organic Chemistry, The Johns Hopkins University. The claims and purpose of the book are well expressed in the translator's preface in which it is stated that the book makes no claim as to

completeness nor does it pose as a textbook for beginners; the main purpose being to outline the methods by which typical difficulties have been overcome and to leave the adaptation of the suggestions to the resourcefulness of the reader. The book is divided into twenty-two chapters. A few of the more important headings are mentioned here to give an idea of the scope and character of the work. There appear chapters on starting materials and extraction, distillation, distillation under reduced pressure and *in vacuo*, dialysis, sealed tubes, filtering, and pressing out precipitates, crystallization, molecular weight determinations, melting-point determinations, drying of solids and dehydration of liquids; drying of gases and removal of a single gas from gaseous mixtures, and a final chapter on the detection of the elements usually found in organic substances. It is hardly necessary to say that this volume is about the most thorough and complete one of its kind now appearing in English. The authoritative character of the material is guaranteed by the reputation of the author.

The translation is one of the best German to English translations that the writer has had occasion to read. It is a pleasure to see how well the peculiarities of the German have been smoothed out and put into perfect English. The writer has searched in vain for any serious errors, either typographical or otherwise. Upon superficial examination one might gain the impression that the material is old and out-of-date but this is not altogether the case since a large number of references to up-to-date material have been added by the editors. The references to original literature given throughout the book seem to be very complete.

It is unnecessary to go into detail regarding the subject matter of the book. It is a book that should be in the hands of every worker in the line of synthetic organic chemistry and should be in the reference library of every institution in any way interested in practical methods of organic analysis.

A. H. CLARK.

Annual Survey of American Chemistry, Vol. 3 (1927). Prepared under the auspices of the Division of Chemistry and Chemical Technology. National Research Council; Edited by Clarence J. West. The chemical Catalog Co., N. Y., 1928, pp., 395, $3.00.

The intentions of the sponsors of this enterprise are excellently conceived, but the actual value of the subsequent result is rather uncertain. This is evident, considering the necessarily superficial treatment of subjects in a publication of this type and scope. Its intrinsic value lies only in the presentation of material derived from widely diversified sources. The availability of the data in this publication is, however, curtailed to a great extent, since the book sustains the inestimable disadvantage of lacking an index. The contents of the volume consist of the selective compilations of 52 contributors representative of the following technical affiliations; College Professors 15, Research Institutions 4, Federal and State Bureaus 13, Private Corporations 16, Individuals in Private Practice, 4. Of the 46 chapters comprising this work, the "Survey of American Pharmaceutical Chemistry" is the briefest in the book, occupying only three pages of data based on 24 bibliographic references. Comparison with space devoted to other topics, *e. g.*, Thermodynamics, Kinetics, etc., Rare Earths, Petroleum, etc., can only suggest negligence in conducting the survey of Pharmaceutical Chemistry or else a space restriction imposed on a more adequate report of the progress made in this important branch of American industry.

A survey of Electro-Chemistry which has been omitted, would be a valuable and appropriate addition.

The Authors' Index, consisting of 11 pages, lists 5440 references which ordinarily can serve of no use in locating specific data. Summarily, the book in view of its exorbitant price, the superficial treatment of the subjects generally, and the inclusion of a preponderating amount of purely theoretical data can but serve as a valuable acquisition as a research reference or an abstract historical record of American Chemistry. The needs of the pharmaceutical chemist can still be best served by the YEAR BOOK OF THE A. PH. A.—SIMON MENDELSOHN, 3560 Wilson Ave., Cincinnati, Ohio.

Tablets.—(I) The Evolution of the Tablet Machine. (II) A Bibliography on Tablets. By P. A. FOOTE—a thesis submitted for the degree of Master of Science, University of Wisconsin.—Published in *Bulletin* of the University of Wisconsin, serial number 1566, General Series No. 1340.

Mr. Foote presented part of the subject in an illustrated lecture at the St. Louis meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION. The *Bulletin* has 164 pages. The first 66 pages, describe "The Tablet as a Mode of Adminis-

tration," "The Evolution of the Tablet Machine," illustrated, in which the constructions of the machines are discussed; including also processes of manufacture, formula construction, excipients, methods and data relating to granulation, sieving, drying and compression.

The Bibliography of Tablets covers 78 pages and is arranged according to years in which the articles appeared. Brief statements relating to the article are made and important data are given. There are five pages in the author's index containing more than 200 names, not including anonymous articles which number considerably over 100 references. The subject index has fifteen pages of nearly 50 lines to the page.

The presentation shows careful search and reading and the bulletin should find a place in every library of pharmacy schools and manufacturing establishments. We understand copies of the bulletin may be had from the University of Wisconsin for 50 cents.

Die Parfumerieindustrie—The Perfume Industry. A reference book for perfumers, chemists, pharmacists and soap makers with a review of related literature and patents by Alfred Wagner. 596 + XII pages, 93 illustrations, paper binding. Price 29 R.M. Publisher, Wilhelm Knapp, Halle (Saale).

The author says in the foreword that the object which led to the preparation of the book was to bring the literature and patents pertaining to the industry up-to-date, the older literature and patents being contained in Mann's excellent book. This object has been attained.

All phases of the industry are covered. A partial knowledge of the scope of the work is revealed by a few of the chapter titles given below, which are selected from various parts of the book. The Laboratory of the Perfumer; The Water; Odor Chemistry; Natural Scents (subdivided according to source into plant and animal); Artificial Scents; Colors and Coloring Materials; Volatile Oils; History of Perfumery; Pomades; Toothpastes; Agents for Sunburn; Smelling Salts; Bath Salts; Sachets; Skin Creams; Cold Creams; Lip Pomades; Powders; Incense; Nail Polishes; Insect Repellants; Soap Making, etc.

Excellent features include: *first*, a critical note of the quality of materials from different sources, that best suited for use being frequently noted; *second*, numerous references to the original literature; *third*, a very complete index.

In addition to the general discussion of the materials and products used in and into which perfumes enter, critical data are given to determine the quality of the materials. Hundreds of modern recipes are given for various toilet and pharmaceutical preparations. This alone should make the book valuable to all who are engaged in the manufacture of such products. The author recognizes that a book recipe does not always yield a product suitable to all needs. However, given a basic recipe, the manufacturer may by slight modification obtain a distinctive line of products. A sufficient variety of recipes are given for each type of preparation to permit selection. When the material used in any given recipe is marketed and used under a trade name, the source from which it may be obtained is indicated by abbreviation and reference to the manufacturer thereof.

Over 265 pages of the book are devoted to recipes, which have been collected from various sources with directions for their preparation. Taking the agents used to cleanse the mouth and teeth as a typical illustration of this portion of the work, the following number of recipes are found: *Neutralizing Agents*—tooth powders 2, mouth washes 4. *Astringent Agents*—mouth washes 2. *Antiseptic Agents*—tooth powders 2, mouth washes 8. *Cleansing Agents*—tooth powders 17, tooth pastes 14, tooth soaps 3, mouth washes 40.

A comprehensive survey of the literature and patents covers 21 pages. An excellent index of patents, authors and subject matter is included. The book is notably free from errors. It is well printed on good paper and merits better than paper binding. It is a valuable addition to library reference works treating of perfume raw materials, perfumes and products into which perfumes enter. It should find a useful place in the libraries of perfumers, soap makers, pharmaceutical manufacturers and of those individuals engaged in such work.

GLENN L. JENKINS.

CHANGING PROMOTION OF NAVAL DENTISTS APPROVED.

The House Committee on Naval Affairs on January 15th voted a favorable report on a bill (H. R. 480) extending the existing law regarding the promotion of dental surgeons to all officers in the Dental Corps of the Navy.